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# REVIEW of EDUCATIONAL RESEARCH

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VOLUME VIII

FEBRUARY 1938

NUMBER 1

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## PSYCHOLOGY AND METHODS IN THE HIGH SCHOOL AND COLLEGE

Reviews the literature from January 1934 to July 1937

Literature of earlier periods was reviewed in

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AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

A Department of the

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WASHINGTON, D. C.

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Volume VIII

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## PSYCHOLOGY AND METHODS IN THE HIGH SCHOOL AND COLLEGE

Literature reviewed from January 1934 to July 1937

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## FOREWORD

**T**HIS ISSUE of the *Review of Educational Research* parallels the December 1937 issue, which dealt with psychology and methods in the elementary school. Many readers will find it profitable to pursue the treatment of their fields of particular interest also on the elementary-school level by consulting the preceding number of the *Review*.

The committee have included in the present review a certain amount of material on the curriculum, on measurement, and on teacher preparation, in connection with the subjects, methods of teaching, and psychology of the school subjects. This breadth of treatment should prove acceptable, as a reader's interests usually extend somewhat beyond one or two aspects of a subject field.

The committee have also followed the usual practice of including a certain amount of material that is not based directly on newly collected data. This practice grows out of the belief that penetrating analyses and interpretations of problems are of fundamental importance in calling the attention of both research and field workers to significant considerations, which may point the way for further research, as well as offer suggestions for practice pending the results of more thorough inquiry.

As in the issues devoted to the elementary school, the chapters have been arranged in alphabetical order according to name of the subject field.

Appreciation is expressed to James B. Tharp and to Elmer W. Christy for assuming at a very late date the responsibility for the preparation of chapters.

DOUGLAS E. SCATES,  
*Chairman of the Editorial Board.*

## INTRODUCTION

THE FOLLOWING REVIEW OF RESEARCH in the psychology and methodology of high-school and college teaching covers the period from January 1934, to July 1937. Reviews of a small number of studies which were omitted from the preceding summary of research in the same field for the period covered in the *Review of Educational Research*, December 1934, are included in the present summary.

At least two conclusions may be reached by a reader who has examined the summaries which make up the body of the following report. The *first* is that many of the studies in the field of psychology and methods in high school and college are not of high quality. Despite this conclusion with respect to researches in the field under consideration, it is encouraging to note that several reviewers—for example, Powers who prepared the section dealing with science and Coon who prepared the section dealing with home economics—express the judgment that the quality of research has improved in these particular sectors of the field. The *second* conclusion is that reviewers differ widely in their interpretation of instructions from the Editorial Board of the American Educational Research Association to make their reviews critically evaluative. There is, nevertheless, evidence of critical evaluation in the summaries—enough, the chairman believes, to indicate an increasing critical-mindedness on the part of those who prepare the several summaries that appear in the *Review*. For example, McDonald and Tharp, in their section on modern foreign languages, and Moore, in the section on art, set up rather rigorous criteria as a guide to the selection of reports for review. As a result, in both cases only a small number of studies were included for review. Smith's chapter represents a selection from 1,139 reports. Coon, after pointing out the limitations of much of the research in home economics, indicates how essential it is for an investigator of a given problem in the psychology or methodology of home economics to substantiate the findings of previous investigations of the same problem or related problems. At least by implication, a similar recommendation is present in other summaries. Anderson, Everts, Powers, and Wilson make critical suggestions regarding needed investigations in their respective fields. The reviewers cite many instances of the inadequacy of the instruments by means of which data were obtained, and the failure to observe careful control of conditions in experimental work; several point to unsupported conclusions that have appeared in reports of research.

Progress in the scientific study of the psychology and methodology of teaching at the high-school and college levels probably is retarded because the standards that investigations and reports should meet are not applied with sufficient rigor. Reports of reputed research find their way

into print too easily. As a consequence, a critical reviewer of research in this field spends amounts of time and energy in reading, selecting, and summarizing material, that are clearly incommensurate with the returns. A realization of the disproportion between the returns and the expenditure of time and effort necessary to prepare a critical review may have been responsible for the difficulty experienced by the chairman of the committee in getting educational workers to participate in preparation of the present summary. Three of the members of the committee who had accepted an invitation to serve later found it impossible or inconvenient to assist. Two collaborators also accepted an invitation to participate, and subsequently declined—at a date so late that their replacement was embarrassing.

The chairman of the Committee on Psychology and Methods in the High School and College wishes to express appreciation to all who have in any way helped to prepare the summaries reported in the following pages, and especially to those whose invitations to participate were extended at an unconscionably late date.

CHARLES W. KNUDSEN, *Chairman,*  
*Committee on Psychology and Methods*  
*in the High School and College.*



# CHAPTER I

## Art

JOSEPH E. MOORE

**I**T IS THE PURPOSE of this review to interpret and evaluate those studies which meet the following criteria: (a) a clearly defined problem; (b) a clear-cut procedure; (c) an acceptable method of collecting data, such as the experimental, questionnaire, survey, and test; (d) quantitative results; and (e) conclusions drawn on the basis of the obtained data. The studies reviewed were selected from an examination of 103 articles covering a period from January 1, 1934, to August 1, 1937.

There are many general and theoretical articles appearing in various journals but few are of an experimental or objective nature. The need for experimental or objective studies in the field of art has become increasingly clear during the course of this review.

### Survey and Questionnaire Studies

Ziefeld (10) reported a survey of the art interests in a town chosen for its "typicality." The findings showed that the art interests of the community were related chiefly to daily activities, homes, gardens, clothes, recreations; that technical art skills were not considered useful; that the general level of art tastes was rather uniform. The number of subjects and the methods by which the survey was conducted were not clearly stated. The investigation suggested that the experience and needs of the community, if used as a background for the teaching of art, might make that subject functionally useful.

The Federated Council on Art Education (1) conducted an extensive questionnaire survey on 1,367 subjects drawn from twenty-four states. The data indicated that high-school pupils believe courses in art help them to recognize and appreciate typical examples of painting, architecture, sculpturing, costume designs, and crafts. Art discussion in the home centered around color. Art students in higher institutions reported favorably on art courses taken in high school. This report should prove helpful in mapping certain trends in art as well as in bringing to light certain needs not previously pointed out by less comprehensive studies.

Traill and Harap (8) threw light on the art preferences of junior high-school students. A group of 384 girls and 313 boys served as subjects. Each subject indicated on a questionnaire his choice of any art process—subject, medium, and product he wished. A tabulation of the responses revealed the following preferences:

process: painting  
subject: nature

medium: paint  
product: a usable object

The method used by these investigators might prove valuable as a basic approach to the teaching of art at the elementary, high-school, and college levels.

### **Relation of Art Ability to Intelligence**

Tiebout and Meier (7) made an interesting attack on the relation of art ability to intelligence. A group of 24 high-school pupils, rated by their art teachers and supervisors as being unusually gifted, were compared to a group of 48 pupils rated as superior, but not gifted, in art. The gifted art pupils had an average I. Q. of 109 against an average of 107 for the superior but not gifted group. No measure of variability was presented. The pupil rated as most gifted in art had an I. Q. of 101. Statistical treatment of variability and reliability should have been presented.

In another study Tiebout and Meier (7) investigated the intelligence of 51 adult artists listed in *The Bibliography of American Artists*. The average I. Q. was 118. There was marked variability in the scores, however: 9 artists were of average intelligence, 12 were superior, 26 were very superior, and 1 ranked near genius. A low correlation was found between the ranking of the artist in the group and his I. Q. This study represents one of the few attempts to measure the mental ability of artists who have attained recognition.

### **Individual Differences**

Steggerda (6) gave the McAdory Art Tests to 300 Navaho Indian children from eleven to eighteen years of age. The conclusions indicated that the Navaho girls were consistently better than the boys, although both groups were below the average of New York City children of the same age. This investigation suggests further research along the line of racial and individual differences.

Horovitz (3) threw some light on the problem of individual differences in drawing familiar objects from memory. A group of 170 adults, 74 men and 96 women representing the white, yellow, and black races, served as subjects. The ability of these subjects to draw from memory such familiar objects as a chair or a church bore a strong likeness to the schematic drawings of children. Race, profession, and general background indicated only "minor differences." The sense picture is apparently a combination of visual, tactile, auditory, and olfactory sensations. The author did not tell how he selected his subjects and he failed to state their age range and the locality from which they were selected.

### **Transfer of Training**

Flory (2) studied the influence of art training on mirror tracing. A group of seven art and seven non-art students at the college level were compared in ability to trace a mirrored image of a six-pointed star. Art students at



the start were almost twice as fast as the non-art group. Considerable transfer from art seemed to occur. The investigator did not use a uniform procedure for all subjects, his mirror tracing equipment was not standardized, and the method of timing was questionable.

### **Vocabulary and Terminology**

Whitford (9) attempted to clarify the meaning and use of the word *tone* in art. On the basis of a study unit submitted to 28 authorities on art and art education the author concluded that the word *tone* (or *tonality*) should be classified as an attribute and not as an element, and that the word *tone* should be used to mean unity or prevailing effect of value and color. This article by Whitford brings into bold relief the difficult problem of meaning.

Knauber (4) developed and standardized on 1,907 students a multiple-choice test of art terms. The reliability coefficient was found to be  $.67 \pm .09$  on one group of 16 students and  $.78 \pm .03$  on 100 students. This Art Vocabulary Test should be further validated by being given to students with varying degrees of art training to see if it distinguishes among them. Further study should be made on the test's reliability. Knauber reported that a group of college juniors in art scored 43 points above the median score of non-art students. Populations were not reported. On the basis of the difference in scores the author concluded that her test provides "a common sense criterion for estimating the amount of native art ability possessed by a student." From the data presented it is difficult to conclude that the Knauber test measures native art ability.

### **Diagnosis**

Meier (5) described the available art tests and summarized the various findings related to art capacity, aptitude, appreciation, and talent.

### **Summary**

The art interests of average people are closely related to daily activities such as planning homes, arranging furniture, planning gardens, and increasing their enjoyment of the movies. High-school pupils report that art courses aid them in appreciating typical examples of painting, architecture, sculpturing, etc. Junior high-school pupils prefer to paint objects from nature and indicate that the product should be usable in the home.

A summary of the comparative studies indicates the following results: Indian children fall below the average of New York City children on the McAdory Art Tests; gifted art pupils at the high-school level score above average art pupils on a mental test; adult artists recognized as outstanding obtain a somewhat superior rating on an intelligence test; art and non-art students seem to be differentiated by the Knauber Art and the Knauber Art Vocabulary Tests; the drawings of adults from memory bear a strong likeness to the schematic drawings of children; training in art seems to

transfer to mirror drawing; certain concepts as *tone*, are in need of clarification. An excellent discussion of diagnosis in art has been published by Meier (5).

### **Needed Research**

Genetic studies of art ability are needed and vocabulary studies of a broad, well planned type should prove valuable. Experimental studies are needed to determine the value of certain methods of teaching art. There is much need for studies to clarify the status of the validity and reliability of certain art tests.

## CHAPTER II

### Character Education

VERNON JONES

#### Two Major Trends

**I**N THE THREE YEARS under review two main constructive trends have been noted which seem destined to affect practice and research in character education in more than a passing way. The first is emphasis upon the study of motivation behind ethical and unethical behavior and the necessity for basing character education upon the results of such study. Too often the attitude among those interested in character development has been that wrong or unethical behavior is a sign of lack of knowledge as to what is right or else simply a willful choice of the wrong by those who know the right. It is from such an oversimplified analysis as this that spring the fad-like excesses in the use of codes, mottoes, general precepts, and the marking of young people on "traits of character." A different view stressing the complex motivation of moral and immoral behavior has been presented by Healy and Bronner, Groves, Olson, Baumgarten, and others.

*Motivation of conduct*—Healy and Bronner (31), who have spent many years in the study of juvenile delinquency, concluded that the origins of delinquency unquestionably represent the expressions of desires and urges which are otherwise unsatisfied. For the onlooker, delinquency merely signifies misconduct, but for the offender it is just as much a response to inner drives and outer stimuli as any other kind of conduct. Baumgarten (13) stressed the view that any character "quality" may be determined by various factors and also that any such "quality" may find multiple expression. As a result of this, character "qualities" may be masked so that what really exists can be denied or hidden while what does not exist may be pretended. By an unanalytical observation of the moral behavior of a youth, therefore, we may get very warped ideas as to what the individual needs in the way of education owing to the fact that so much that is germane to character is tied up with the motivating factors behind what he does.

Groves (29) also recognized the importance of the study of motivation and stressed it in his discussion of cheating in school: "In any constructive assault on school cheating there must be an unbiased effort to discover the motives that impel to dishonesty." Much cheating, he concluded, is due to strain. According to this author, overemphasis in the school and in the home on marks, overcrowding in school so that the teacher cannot give the individual attention needed, inability of the schools to adjust work to individual capacities and interests, and the code accepted by children in regard to "getting by," all encourage cheating. Olson (44), in his study of the diagnosis and treatment of behavior disorders of children, especially stressed the point that in preparing general plans of treatment, recognition

must be given to the fact of "multiple causation" and to the consequent necessity of a varied approach in different situations and with different individuals. Fechheimer (24) identified three factors contributing toward intentional lies: fear (usually fear of punishment); compensation for a feeling of inferiority or a desire for greater social prestige; and avoidance of unpleasantness.

This emphasis upon the need for study of motivating factors for clues in educational planning should not be misunderstood to mean a trend toward the excusing of individuals for their shortcomings by attempts to explain them, nor should it be mistaken as leading to a type of education which will set out to make life conflictless or temptationless. It is rather an emphasis upon the importance of looking beneath the surface for motivating factors in the attempt to educate rather than merely to treat symptoms.

*Educational experiments*—The second main trend noted in the period under review is that toward the experimental study of certain methods and procedures in character education under regular school conditions. One illustration of this is the New Haven study by Jones (35, 37). This study was based upon 300 junior high-school pupils, and extended over an entire school year. The methods tried were the first-hand experiencing (or project) method without discussion of traits and meanings, the free discussion method, and the first-hand experiencing plus discussion method. All children were tested extensively on many of the Hartshorne and May tests and others both at the beginning and at the end of the experiment. The main results were:

1. Some improvement on the average was achieved by one of the methods, but that improvement was so small as to emphasize the great difficulty of making changes in actual conduct of children of the junior high-school age.
2. The first-hand experiencing plus discussion method was the only method which yielded any consistent positive results. (This fact seems to stress the importance of supplementing activities or projects by opportunities for generalization and reactions to meanings in all education in this field.)
3. Class morale was a very strong determining factor in moral behavior.
4. There were striking individual differences among teachers in the degree to which they influence the development of individuals, there being some evidence that some teachers were more strongly boy-influencing than girl-influencing, and vice versa.

In the book describing this experiment a detailed description is given of the teaching units and methods employed.

Hobson (34) studied the effect of instruction in the "principles of honesty" upon an understanding of what constitutes honest conduct. In most of his classes he obtained positive results, but there is some question as to the adequacy of his tests as measures of genuine growth in moral behavior. Ballou (11) described the Washington demonstration in character education. This was an elaborate two-year project made possible by appropriations from the Federal Government, totaling over \$150,000. It was designed primarily as a "spearhead" demonstration rather than as a controlled experiment and no quantitative results have been reported. The main emphasis in the program was upon ethical instruction and upon guidance and remedial activities.

The Denver program of character education was described by Fox (27). The essence of the plan is the incorporation of character-forming activities wherever possible in the regular curriculum and in the extracurricular program. The pupils are taught in all school activities to meet genuine life problems. Pendry and Hartshorne (48) made a detailed study of 49 organizations or groups which carry on recreational and character-building activities on a national or sectional scope. The study is suggestive of methods and procedures which might be adapted for school use, particularly in the wider use of the school as a community or recreational center.

Beam (14) made an evaluation of the work of the Civilian Conservation Corps in character development. The contributions claimed for this program are mainly those of improved social, recreational, and work habits. For descriptions of other plans and projects which are suggestive but more limited in their scope and application, see (12, 23, 25). Articles which stressed the key position of the teacher in all character education programs are as follows: (18, 19, 20, 35).

*Studies of ethical behavior*—Several studies have dealt with the amount of unethical behavior among young people. Studies by Parr (47), Moore (42), and Finkenbinder (26) on the amount of cheating among college students when a "good opportunity" was offered (usually in the form of having students mark their own papers) uniformly showed a distressingly high percent who cheat to some extent. The percents range from 33 to 50. Weil (55) found in a study of 644 children that 22 percent lied in a spirit of camaraderie, 15 percent lied because of fear of punishment, and 6 percent of boys and 21 percent of girls lied on account of vanity. Ripperger (51) investigated the integrity of students borrowing from philanthropic foundations. She concluded that the average American undergraduate exhibits little deliberate dishonesty. Among various occupational groups the engineering students proved to be the best risks.

### **General Discussion of Plans and Research**

A number of articles and books giving a general discussion of character education have appeared, but the allotment of space for this review will permit only a bare mention of some of them. The most significant are: a comprehensive textbook by McKown (39) which is practical and based upon sound theory; a textbook on character development through recreation by Heaton (32); a series of three student textbooks, supplying excerpts from biography for study and discussion, by Starbuck (52); a text for use in the discussion of character and guidance problems by Wheatley and Mallory (56); a treatise on the theory of character development by Voelker (54); two articles by Whittaker (57, 58) in which he condemned the wide use of trait concepts and codes in teaching, and stressed the need for learning by doing in real life situations; and an article by Borgeson (16) who emphasized the need for activities plus group discussions, and specified certain books which supply suitable episodes and biographical material to enrich such discussions.

For extensive summaries of different areas of the literature, see Chassell (21), Jones (36), Maller (40), May and others (41), Myers (43), and Olson (45, 46).

### **A Disturbing Controversial Issue**

In concluding this brief review mention should be made of a controversial issue which has attracted much public attention and has tended to divert the energies of some educators interested in the character and citizenship development of youth into a battle among themselves. It is the question as to the degree to which educators, who believe that the character of young people is very largely determined in one way or another by the economic and sociological conditions about them, should attempt to use the schools to usher in a new social order which in their opinion is more conducive to the development of desirable character. One of the strongest pleas in favor of having the schools advocate changes in the social order in the name of character education has been made by Childs (22) who said that "all intentional education is a moral undertaking; moral in the sense that it involves working for one set of social ends and a definite type of personal character as opposed to others. . . . As long as the school is content merely to make an exposition of various social alternatives and to commit itself to the advocacy of no positive social policies, it tends to throw its support on the side of the arrangements and groups which are now intrenched in power." Reisner and Briggs are prominent among those who take the opposite view: Reisner (50), on the grounds of history and principles of government, warned of the danger to legitimate liberalism and to academic freedom in the schools from any attempt to have the schools used as a tool of propaganda, be it ever so well intentioned. Briggs (17), arguing on practical grounds, pointed out a vast difference between the freedom of the scholar to report the results of his investigations in the field in which he is an expert and the freedom of the school teacher to advocate in the classroom acceptance of ideas which are not yet fully substantiated by facts or prevailingly approved by the supporting public.

It cannot be said that this issue is near final settlement, but it does appear that the majority of specialists in the field, while granting the great importance of the social milieu on character development, are tending toward the position that the possibilities for the development of personal character in the existing social order should be exhausted before teachers go further afield. They do not believe that controversial issues should be excluded from study in school, but as a guarantee that the possibility of such study may continue they believe that controversial topics should be dealt with only as they naturally arise on the students' own level of interest and comprehension, and that when they do so arise the teacher's duty is to keep the study on the plane of fact-finding and of objective study of different proposals. (For a good example of a lesson unit where this principle has been followed, see Hatch (30).)



## CHAPTER III

### Commercial Subjects

F. G. NICHOLS

THE PERIOD UNDER CONSIDERATION has not been fruitful in the matter of research in this field. While a number of studies are listed, most of the space is given to a single piece of research which is of outstanding importance.

#### Typewriting

With the aid of a substantial grant from the Carnegie Corporation, Dvorak and others (88) made an extensive and intensive study of certain problems in the teaching of typewriting. The study embraced the following phases: (a) the relation of letter sequences in written English to the location of letters on the typewriter keyboard were studied; (b) finger motions and patterns of motions in typewriting these sequences were analyzed mathematically and spatially; (c) the functional aspects of these analyses of motion patterns were studied by use of motion pictures; (d) more than 3,000 university students were taught typewriting in experimental classes conducted at the University of Washington; (e) more than 3,000 junior high-school students were taught typewriting in Tacoma (Washington) public school experimental classes; (f) approximately 1,000 senior high-school pupils in Tacoma and Seattle were taught typewriting; and (g) a simplified typewriter keyboard on which the letter placement is such as to require the simplest finger motions and patterns in typing English was developed. Students taught typewriting in accordance with methods and materials which the investigators developed were entered in international contests and won eighteen first, seventeen second, and fourteen third places, including a world record for typing from machine dictation.

These investigators point out in their report that the teaching of typewriting can utilize such principles of psychology as:

1. Technic or form is, in the early exercises, more important than the product of these exercises. To teach students to write *perfectly* at low rates tends to develop many habits and technics which must be discarded or revised at higher rates later.
2. As soon as possible a student should use the rate at which he expects to use his skill functionally. In typewriting there should be a compromise between speed and accuracy in the early stages of training with correctness of *form* or *technic* as the deciding factor in the compromise. The way a student types is more important than what he types. If his form is good, the product soon will be good.
3. There is no place in the early lessons of typewriting for repeated letter drills, nonsense syllable letters, letter location drills. Isolated word drills should be confined to words for which the student has immediate use and lines of words (rather than single words) should be repeated. Copy should be sequential as soon as a few of the letter locations are mastered.

4. Instruction in the applications of typing to vocational purposes is a handicap to the mastery of skill in typewriter manipulation, and except for the simplest applications should be delayed until the student has developed expertness in typewriter manipulation.

5. Touch typewriting should be regarded as an end and not as a means. To require pupils to avoid the use of the eyes in learning the spatial relationships on the keyboard is to deprive them of one of the most important aids in the mastery of these spatial relationships. So-called touch typewriting seems to be about the only instance in life where people are expected to learn spatial relationships without the use of the eyes.

The investigators characterize typewriting learning in the following terms:

1. So-called habits, particularly typing habits, are shifting, conditioned behavior. As an illustration of conditioning to countless slight signals, or cues, typewriting is admirably clear-cut.

2. Typing improvements are complete behavior patterns. Each better typing motion that appears does so as a new, complete pattern.

3. The direction of typing progress is itself a striking gradient or slope in muscular activity.

4. Learning to typewrite, like all learning, is chiefly student thinking along a path charted to reduce difficulties and thus to reach desired results. This is the fascinating path of motion study, long since cleared by experts in this field.

5. Early accuracy is of only moderate importance.

6. Suitable speed is of immediate importance.

7. The key to successful typing is in control and relaxation.

8. The isolated letter stroke is not typewriting; yet students are led to believe that they must drill and glorify isolated letter strokes.

9. Rhythm is basic in fast typewriting.

10. Guides to typing skills are slow-motion pictures, which reveal direct manipulation, correct stroking, and fluency, along with other diagnostic devices to iron out hesitations and bring evenness of timing. Usually students are forced to copy from printed manuals instead of directing attention primarily to the mastery of motions involved in typewriting.

11. Direct dictation is time-saving. Usually little of it is given in typewriting classes.

At the beginning of each chapter of the report there is a paragraph addressed "To the Student Typist" in which his attention is directed to certain important points in the chapter which the learner should note especially. Another paragraph is addressed "To the Psychology Student" to make it possible for the student of psychology who is not interested in the teaching of typewriting to glean from this report what will be of most interest to him. There is a third statement in the initial paragraph addressed "To the Typing Instructor" in which his attention is called to specific teaching aids which will be found in the chapter.

As a result of this investigation, the authors developed what is called the "simplified" keyboard for the typewriting machine. The proposed new methods of teaching typewriting, however, are quite as valuable for the "standard" keyboard as for the new "simplified" keyboard. The new keyboard has been so constructed as to involve the smallest number of motions and the proper sequence of motions in the act of typing. It is claimed by the originators of it that approximately 70 percent of typing is done on what is called the "home row" of keys, whereas less than 30 percent of typing is done on these keys on the standard keyboard. Many other advantages are claimed for this new keyboard.

## Business Subjects

Eriksen and others (92) undertook to discover new methods of teaching the vocational business subjects with a view to shortening the time required to reach the vocational objectives of these subjects. It was recognized that requirements of business have changed greatly during recent years, whereas methods of teaching the business subjects have undergone little change during the past two decades.

The vocational business subjects included in this experiment were shorthand, typewriting, bookkeeping, business English, and office practice. On the basis of test results from 5,000 men and women examined at the Occupational Analysis Clinic of the Employment Stabilization Research Institute of the University of Minnesota, certain re-training courses were organized and conducted for five months. Teachers for these courses were chosen with respect to their qualifications for experimental work. Ability grouping was used as far as was possible.

In the shorthand classes, all dictation was of the direct sentence form, and transcription was required almost from the outset. At the end of twenty-one weeks some of the 46 shorthand students were able to write at the rate of 100 words a minute while the poorer ones were able to write 30 words a minute. The report of the study included some data regarding the relationship between I. Q. and ability to do shorthand work. Data regarding ways and means of predicting possible success or failure in shorthand classes were also reported.

In the typewriting experiment two of the classes were taught on machines equipped with the Dvorak-Dealey Simplified keyboard. It was found that the speed of the superior students who used the simplified keyboard for a period of only twenty-one weeks compared favorably with that of students who used the standard keyboard for a period of forty-six weeks, while the speed of the lower-grade students equaled that of the standard keyboard students at the end of thirty-six or forty weeks.

This experiment tended to show that there was some degree of correlation between typing speed and the motor reaction test which was given at the outset in the course. There was some evidence, also, to the effect that a student's copying ability was not greatly affected by the quality of his intellectual powers. Better students, however, tend to do better all-round typewriting on a production basis.

In the bookkeeping courses, the balance sheet approach was adopted after consideration of various ways of introducing this subject. Corporation and manufacturing accounting methods were used at the beginning of the course instead of the customary single proprietorship and partnership methods. Ability grouping proved to be advantageous. Comparisons between results obtained in these experimental classes and those obtained in traditionally taught classes indicated that newer methods of teaching seemed to be better for this subject.

According to the investigators, the results seemed to indicate that the good student can master the subject of bookkeeping in from three to five

months, provided the instruction is of the right sort. Many suggestions for the improvement of instruction in this subject were given.

In the business English course, classes were conducted on the laboratory plan and, as far as was possible, each student received individual instruction. The investigators seemed to be satisfied that this method of instruction in this subject is superior to usual methods. It was found that knowledge of grammar plays an important part in the success of stenographers.

The experiment also included courses in so-called office practice. The various units of clerical procedure were included and an attempt was made to find out whether or not prognostic tests were useful for predicting the quality of work which students were likely to do in these clerical units of instruction. The project method was used throughout the experiment.

### Conclusions

These investigations throw a good deal of light on a problem which confronts commercial educators—that of bringing instructional methods in the commercial field up to date. Typewriting is a skill subject. Mastery of this subject should be accomplished in the shortest possible time in order to provide greater opportunity for worthwhile education of a more substantial variety. Shorthand is but the facilitating means for doing certain work connected with communication. There is a great deal of training that needs to be done after the mastery of the shorthand system has been accomplished. Hence such mastery should be accomplished in the shortest possible time. It ought not to be necessary to devote two or three years to the mastery of the technics involved in typing and writing shorthand notes.

There is not such need for haste in the mastery of the principles of bookkeeping and the development of power in their application since the subject is rich in educational values, but it does seem possible to develop ability to do ordinary bookkeeping work in shorter time than is now taken for this task. Improvements have been made in the teaching of this subject and it is quite likely that the boys and girls taught in the better schools today have a clearer understanding of the principles of accounting than did those who had their instruction a decade or two ago. On the other hand, there is some reason to believe that boys and girls taught under present conditions do not possess the same degree of bookkeeping skill as was possessed by those who were taught when skill development was a more specific objective of instruction.

In most schools only a smattering of instruction is given in clerical work involving the usual office machines. In but few schools has there been any serious attempt to develop occupational competency in this particular field, notwithstanding the fact that 90 percent of all office workers are doing non-bookkeeping and non-stenographic work—work which requires a high degree of facility in the operation of many office machines and devices, and competency in routines other than taking dictation and transcribing it or copying on the typewriter.

## CHAPTER IV

### Education and Psychology

I. H. ANDERSON

THIS REVIEW is confined to published reports of experimental studies on problems of method in teaching psychology, educational psychology, and courses in education. Except for one (152), all of these studies have appeared during the period from January 1, 1934, to July 1, 1937. Several studies were omitted because they have already been included in a previous issue of the *Review of Educational Research* (149). References to these omitted studies, however, are contained in the present bibliography (144, 146, 150, 153, 163, 164, 167).

#### Factors Related to Achievement

*Student interests*—Dimmick (145) compared groups of superior and inferior students of general psychology in terms of their work interests, as these are measured by Miner's Blank for the Analysis of Work Interests. Statistically reliable differences in work interests were found between these groups, as well as between groups of non-psychology and psychology students. It was concluded that, in addition to intelligence, there exist certain work interests and attitudes which are contributory to success in specific college courses. The necessity for postulating such additional factors is, of course, indicated by the relatively low correlations which have been obtained when intelligence test scores alone are correlated with achievement. The author recognized the possibility of using his results in student guidance.

*Student preparation*—Eurich (147) reported correlations ranging from .13 to .40 between test scores in general psychology and final grades in educational psychology, with intelligence held constant. In view of the lowness of these coefficients, Eurich concluded that there is little justification for maintaining that general psychology is a necessary prerequisite for study in educational psychology. This conclusion must be considered as tentative, however, for although one may not be able to predict relative standing in educational psychology from a knowledge of test scores in general psychology, the *average* achievement in educational psychology may have been raised by previous training in general psychology.

Gilliland (148) studied the effect of a zoology course on grades in general psychology by comparing psychology test scores of students who had not had a course in zoology with the test scores of students who had had such preparation, and found that the latter were superior both in their examination scores on the zoology part of the general psychology examination, and in their final grades in psychology. These findings support the



natural expectancy that the greatest transfer from one course to another would be in topics which are treated in both courses, namely, learning, motivation. If this proved not to be so, some discrepancy in the way in which these topics are taught in the two courses would be indicated.

*Study habits*—Ketron (154) compared a group of students in the College of Education of the University of Kentucky who were required to register for a course entitled "Psychology of Study" with a group of students in the College of Arts and Sciences where no such study course was offered. The differences between the groups in terms of persistence in the university and in academic achievement were not statistically significant. Lauer (157) conducted an experiment in which it was attempted to improve the reading habits of students in educational psychology. The training, which was given as a regular part of the course, consisted of 20 periods of practice during which certain rules for improving reading were self-administered. An average increase of 35 percent in the rate of reading was secured; the greatest gain was found in reading non-technical material. The initially most rapid readers showed the greatest percent gains. No data were reported relative to gains in comprehension, nor was an attempt made to study the influence of the training in reading on achievement in educational psychology or in other courses.

*Prognostic tests*—Terry (165) found that scores on the Van Wageningen Reading Scale in Educational Psychology, the Iowa Silent Reading Test, and the Otis group intelligence test, correlated respectively, .72, .63, and .69 with scores on a mixed objective and essay examination in educational psychology. The prognostic efficiency of the Otis test was not reliably improved by combining it with either of the reading tests. In the light of these results it was concluded that either the Van Wageningen Reading Scale or the Otis group test is reliable enough for practical use in predicting achievement in educational psychology.

### **Lecture Methods versus Other Types of Instruction**

Hartmann (151) reported the results of a study in which one of two matched groups of general psychology students attended a regular class consisting of recitations and lectures thrice weekly, while the members of the other group were allowed a limited number of individual conferences with the instructor in place of the third class period. The results were essentially negative, for although differences between the groups on various measures of student achievement appeared, in no case were these statistically significant. Barnard (139) compared the efficacy of a lecture-socialized recitation method with that of a group study method. One of two equivalent groups of students in educational psychology were given three lectures per week for eight weeks, and then received one lecture and two meetings with the instructor during each of eight more weeks. The above procedure was reversed with the other group. Objective examinations given to both groups at the end of the eighth and sixteenth weeks failed to demonstrate the superiority of the one method over the other. In a



study in which learning from lectures was compared with learning from reading, Corey (143), too, failed to find a reliable difference attributable to a difference in the method of presenting material.

### **Measurement of the Results of Teaching**

In an attempt to determine the influence of his teaching on students' values, Bowden (141) administered the Allport-Vernon Social Values Test to a group of college seniors, before beginning and after completing a course in social psychology. The results indicated that the average change in the individual student's rating in each of six categories considered was about 20 percent. This change was not related either to the age or to the sex of the subject or to his personality type, as measured by the Allport A-S Reaction Test. In another study in which an attempt was made to measure teaching efficiency in terms of change produced in students, Hartmann (152) found that the instructor who is responsible for the greatest number of desirable changes in the persons under his influence can be identified with reasonable accuracy by means of extensive testing wherever he is teaching a course which others also are teaching.

### **Problems of Testing in Relation to Motivation and Learning**

*Frequency of testing*—Keys (156) studied the influence on learning and retention of weekly as opposed to monthly tests. Two equated groups answered the same questions on the content of a course in educational psychology. The experimental group was given these questions in weekly tests, while the control group received them in monthly installments. The tests for both groups covered the material of the immediately preceding period of instruction. The mean score of the experimental group on all of the questions was 12 percent higher than that of the control group, and their retention as measured by retests was 7 percent higher. That the retention of both groups was probably aided by the periodic tests, all of which served to counteract a tendency toward forgetting, is indicated by the results of another study by Keys (155) in which it was found that if certain true-false items are contained in a mid-term examination, as well as in a pre-test, there is greater retention of these items on a final examination than when these pre-test items are not included in the mid-term quiz.

*Length of examinations*—In a report of analyses of new-type examinations in psychology, Bird and Andrew (140) found that abbreviating a 150-item test by eliminating every third item (in a rescoring) resulted in an odd-even reliability which was only slightly lower than that of the longer form; nor was the validity of the testing seriously impaired, for from 75 to 84 percent of the letter grades remained unchanged when the scores from the shorter test were used. The validity of the abbreviated test might well have been higher than that of the original form had the items from the latter been discarded on a discriminatory rather than chance basis. For example, Valentine and Wenrick (166) found that a

psychology examination, designed to test the ability to apply principles and to distinguish observation from inference, failed to differentiate paired groups of non-psychology and psychology students; by carefully selecting items, however, they were able to evolve a form which may be regarded as a valid examination for courses in psychology.

Closely related to the problem concerning the length of new-type examinations is that of determining the optimum length of the test period. Rogers (162) studied the influence of the time of work periods on grades on eleven objective-type examinations given in an elementary psychology course. As soon as a few of the students had finished each examination, all papers were collected and scored. Then the same papers were returned, and each student was given the necessary time to complete the examination. The mean correlations between timed and untimed tests ranged for different type items from .77 to .84. In view of the relatively small shifts among students in class standing from the timed to the untimed examinations, it was concluded that in administering new-type examinations in psychology it is legitimate to stop the class when only about 5 percent of the students have finished.

*Effect of kind of test announced on methods of study and achievement*—In investigating how advance knowledge of the type of examination influenced the methods of study of students in three classes in tests and measurements, Class (142) found that students paid much more attention to details when studying for objective examinations than when preparing for an essay-type test. In a somewhat more extended investigation, Meyer (160) found that in preparing for essay-type tests, students made summaries and answered sample questions; in studying for true-false and multiple-choice tests, they took random notes and underlined details in notebooks; and in studying for completion tests, although the method of their preparation was the same as that for true-false and multiple-choice tests, they exerted more effort.

Meyer (159) also showed that differences in methods of study cause differences in test results. Four matched groups of elementary psychology students were instructed to prepare for multiple-choice, true-false, completion, and essay-type examinations, respectively. Then each of the four groups was tested with all four tests. The results, confirming those of an earlier study by Meyer (160), are interesting as showing that the examination set is effective not so much for the reason that different types of examination require fundamentally different types of preparation, but as indicating rather that if material is studied for the purpose of reproduction, the preparation will result in a superior test performance, regardless of the specific type of examination administered. For the most economical learning, therefore, students should study preferably with an essay-examination set.

*Teaching value of examinations*—McClusky (158) compared the teaching value of two methods of scoring examination papers. Of two paired groups of college students, who were given the same mid-term test, one

group corrected their own papers by merely checking on the rightness or wrongness of their responses, while the other group participated in a discussion of the reasons for considering each answer correct or incorrect. Retests were made with the same examination administered without warning. The group who had merely checked their answers showed no loss, the checking having apparently counterbalanced any forgetting which might have occurred. The discussion group, however, showed a marked gain on the retests. Morgan and Morgan (161), also, showed that a knowledge of success or failure on the items of a pre-test results in a significant amount of learning, as indicated by the results of retests. The above findings suggest that examinations should be scored, with corrections indicated, and returned to students.

### Summary and Conclusions

The studies here reviewed have not, in general, contributed much in the way of new and significant information relative to the problems of method in teaching psychology and education courses. Many of the studies which yielded positive results seem merely to have confirmed in rather special situations the findings of earlier laboratory work. For example, the finding that relatively frequent testing by means of short examinations results in economical learning might be anticipated on the basis of work as old as that of Ebbinghaus, and certainly on the basis of the more recent laboratory research on memory and forgetting. Again, the finding that a knowledge of success or failure on the items of an examination results in improvement on retests seems merely to confirm the well-known fact that a knowledge of results facilitates learning. Finally, the finding that studying for the purpose of reproduction is superior to studying for the purpose of recognition may be explained by the fact that a more thorough type of learning is required to reproduce than to recognize material—a fact with which almost every student of the elementary course in laboratory psychology is familiar.

These studies are, however, valuable as showing that results obtained in the somewhat artificial setting of the laboratory also hold practically. This validation is important, for one cannot always safely assume that principles of learning discovered in laboratory experiments operate also under the conditions of the classroom.

Other studies yielded negative results. Included among these were Eurich's study (147) on the transfer value of general psychology, and those studies which compared the efficiency of lecture methods with other types of instruction. The findings of these studies, however, are not necessarily final. Results are always conditioned by the circumstances under which they were obtained. For example, if one of the specific objectives of the course in general psychology were to prepare students for educational psychology, the results might be entirely otherwise. At any rate, there is need here for further research.

An important factor in the failure to secure positive results may be the tests employed. Although methods which give students a small amount of individual attention may not increase scores on course examinations, it may be that such tests are not adapted to detecting changes actually produced. It might be that other tests would reveal that these methods had contributed significantly to attitudes, ideals, habits of work, etc. If future research should show this to be the case, the results would be very important, for such personality modifications persist after almost all the facts learned in college are forgotten.

## CHAPTER V

### English Language, Reading, and Literature

DORA V. SMITH

THE REVIEWS presented in this chapter supplement Leonard's "English, Reading, and Literature" in the *Review of Educational Research* for December 1934. The writer has been aided by similar reviews which have appeared during the interval by Bagley (174), Betts (177), Gray and others (211, 212), and Greene (216, 217, 218), and by the reports of the research committee of the National Council of Teachers of English (259). Lyman and Anderson's *Selected References* (244) and the extensive bibliography by H. L. Smith and Painter (282) were also useful. Applications of research to the practical problems of the school have likewise been presented during the interval by three reports of the American Educational Research Association (260).

#### High-School Composition

Ash (173), using paired groups in the junior high school, found pupils made greater progress in both form and content in composition when form and mechanics were subordinated to thought and sentence structure. Littwin (242) succeeded best in developing power in imaginative writing by use of sense training; next, by models; and least, by picture study. Jencke (233) found précis writing useful for the eradication of errors among high-school and college students, but not for other powers frequently claimed for it. Lawson (240) judged 35 elementary textbook series examined to be incoherent in objectives and chaotic as to the nature of the content included.

#### College Composition and Prediction of Success

College studies in freshman English were concerned primarily with prediction of success and measurement of progress. In the study at the University of Buffalo (307, 308), the total Regents' average and scores on the Co-operative English Test proved the best predictive measure. At Temple University (210), the Co-operative English Test equaled high-school records or an aptitude test in reliability. In Oregon, the Shumaker English Placement Test yielded a high accuracy in prediction (280). Sarbaugh (277) studied conflicting aims of high-school and college English, proposing high-school seminars for anticipating college examinations as an aid to articulation. V. C. Miller (253) reported slight improvement from year to year in high-school preparation.

Hays (226) traced historically the dominance of college entrance requirements in determining the course in English in American high schools.



The effectiveness of freshman English was measured by Hoag and Bebout (228). All freshmen showed measurable improvement in mechanics and usage. Weak students improved markedly in essay writing; good students retrogressed. Freshmen at Purdue University showed definite growth in mechanics, sentence structure, and reading—the weak more than the strong (271). Jefferson and others (232) found less improvement in mechanics, on which there was a concerted drive during the course, than on purposiveness, organization, and fluency, which may or may not have been direct outcomes of instruction in English.

Eurich and Boardman (202) revealed considerable agreement as to objectives in freshman English at the University of Minnesota, though diametrically opposite standards of usage obtained among individual members of the department. Butler's analysis (185) of errors in freshman themes disclosed special weaknesses in fundamentals. E. G. Williamson (313), testing permanency of results in freshman English at the end of the sophomore year, found improvement shown by all groups, those exempt from English as well as those registered for it. McClusky and Coleman (247) found ability to reconstruct sentence order within the paragraph much less necessary to thought than has been supposed. Allport and others (169) proved that sufficient personality is evident in freshman themes developed by informal discussion methods to be detected by trained judges.

### **The Teaching of Grammar**

Eleven studies pertain to the teaching of grammar. Two, by Boyd (180), and by Gruen (219), traced the historical development of the teaching of grammar. Gruen found that though the aim of recent teaching has been *function* there is great lack of agreement as to elements to be taught and the proper grade placement of them.

Crawford and Royer (195) found oral drill at the seventh-grade level as effective in the elimination of error as the study of grammar. Clark (192), working with weak college freshmen, found grammar study less effective in the development of language technics and the elimination of error than emphasis upon reading and upon thought processes in writing.

Shover (279) reported that the teaching of functional grammar markedly improved the ability of high-school pupils to pass "hurdles" set by the department of English. There were no controls to determine whether this method produced better results than any other, or any evidence as to the validity of the hurdles.

Guiler (220) reported test results at the college level indicative of a distinct need for individualized remedial instruction in English.

Comparison of the grammar desired by foreign language teachers with ratings of items by English experts revealed half of them not essential to English usage. Rivlin (272) suggested the possibility of a separate course in grammar for pupils going into foreign language study, a practice found by Barber (175) to be of little value.



## English Usage

O'Rourke's nationwide study (263) of English usage produced evidence of considerable stress upon niceties of English expression throughout American secondary schools and a falling short of mastery of elements essential to literacy. The amount of progress on individual elements of expression between the third grade and the twelfth is often discouragingly small.

Analysis of the placement tests in use in 130 representative colleges and universities (281) indicated stress primarily upon correct usage, with less than 4 percent of the items in them concerned with technical grammar. However, niceties of expression and outmoded uses loom larger than recent research in the field of linguistics would condone. Pooley (268) discussed this question at length with evidence from textbooks in English. Harriman (222) presented evidence of elements causing greatest confusion in English writing. In 200 informal notes from parents, analyzed by McPherson (250), major difficulties revealed were the run-on sentence, vague or ambiguous wording, and omission of the subject of the sentence. Franzen (205) aimed to find in the usage of various social and professional groups in drama, language standards inherent in the social circles in which pupils move. The handicap of foreign children using English as a medium in reading and expression was revealed in a study by Fritz and Rankin (206).

## Vocabulary

Further information concerning range of pupil vocabulary, grade placement, and frequency of error in the elementary and junior high school is available in Driggs's study (198) of the vocabulary of letters written outside of school; in J. H. Smith's analysis (283) of words useful in various subjects of study; and in Buckingham and Dolch's list (183) of words assembled from 11 previous investigations with revised grade placement for 10,000 words.

## Courses of Study

According to Harap's analysis (221) of courses of study published in 1932-34, high-school English instruction tended to be more concerned than formerly with socially useful and functional materials. Chief among these courses was *The Experience Curriculum in English* (225), the work of 100 experts of the National Council of Teachers of English in adapting the findings of research to curriculum-making.

## English in the Integrated Program

Lee and Root (241) studied the effects of an integrated program in which English, social studies, and art were taught as a unit in one group of classes in the seventh and eighth grades and as separate subjects in

another. Results, measured by tests of knowledge and skills as well as of adjustment, proved that "the problem of bridging the gap between elementary and junior high school seemed to have been accomplished better by the experimental than by the control group."

L. W. Johnson (235) found insignificant differences favoring ninth-grade classes in which writing and speaking were done in connection with all other subjects as contrasted with achievement in segregated English classes.

### Measurement Exclusive of Prediction

Major attention is being given in college circles to the question of adequate measures of attainment in English, especially the relationship of the essay-type to the objective examination. Stalnaker and Stalnaker (289, 290) found that essay tests can be raised to a high level of reliability if the questions are so formulated that a definite restricted type of answer is required, and if readers judge them on the basis of specific predetermined criteria. Stalnaker (285, 286, 287) described in detail comprehensive and scholarship examinations based on this procedure. Traxler and Anderson (302) found a high correlation in ratings of two experienced judges, using the Stalnaker essay test with high-school pupils.

Eurich and Appel (201) expressed the belief that much now being tested by essay tests can be measured by objective examinations. Eurich and Boardman (202, 203) presented data on a comprehensive examination designed to measure 15 different outcomes of freshman English. Brigham (181), at Princeton, likewise increased the reliability of ratings by the use of a scale with eight degrees of merit. Similar studies in England (224), and Scotland (291), the former sponsored by the International Conference on Examinations, revealed grades on English essay examinations to be subjective and untrustworthy, even when detailed values were agreed upon in advance to replace mere impression in scoring. Steel and Talman (291) found as a considerable aid in objectifying judgments, evaluation of vocabulary, sentence structure, and sentence linkings, with a penalty for error, zero for mere correctness, and additional marks for effectiveness. Predominance of form over quality in teachers' evaluations of pupil themes was revealed by Healy's study (227).

Powell (269) produced evidence to show that the correlation between error count and error quotient is so high as to make the additional work involved in the determination of the latter useless. Proof-reading tests proved more accurate than error counts for purposes of diagnosis. O'Rourke (263) produced valuable evidence of the inadequacy of a single example for testing the application of a grammatical principle. As already indicated, placement tests in English now in use in 130 major colleges and universities of America are tests of usage and power (281). More than 75 percent of them exclude entirely all items of technical grammar. They are much less abreast of current standards in the matter of what is acceptable in usage and diction.

Results of the 1935 College Sophomore Testing Program of the American Council on Education (170) indicated that chaotic conditions prevailed in standards of English attainment. In two colleges, sophomore medians in the general English test were below the ninth-grade level, and in eight more, below the tenth-grade norms. In the highest college tested, 15 percent of the sophomores were below the twelfth-grade norm. In literary acquaintance, freshmen and juniors achieved the same medians, with sophomores higher than either. Roughly one-third of the seniors were below the freshman median.

Use of recording equipment for speech correction, foreign language courses, oral reading, and public speaking has proved to be a most helpful teaching and testing device, according to A. B. Williamson's investigations (312) at New York University.

Wrightstone (318, 319), comparing equivalent school systems of the conventional and experimental type, found the latter produced as good results and in some cases superior results in language, reading, and literary acquaintance in comparison with the more formalistic procedures. He concluded that such efforts toward integration have not detracted from the more commonly measured outcomes, but have added increased proficiency in other major objectives.

Moran's measurement (255) of appreciation of poetry and Wells's study (311) of appreciation of aspects of humor should be noted.

### **The Teaching of Literature**

There are only three studies of the teaching of literature as opposed to 73 in the field of reading, within the last four years, except as some of the 15 in extensive reading may be said to involve literary appreciation. Carroll (189) analyzed the way novels are read by 1,000 selected readers of high intelligence and general culture, with a view to determining how the reading of novels should be approached in the classroom.

Allowing pupils to pursue individual subjects in the classroom was found by Block (179) to be a more profitable method of teaching a senior survey course in high school than the daily discussion of topics assigned. Moran (255), measuring the poetry aptitude of 200 teachers, found little distinction in results between those with undergraduate and graduate degrees.

### **Extensive Reading**

Analysis of individual needs and interests in reading coupled with the presence of an adequate supply of books for guidance in the classroom improved the attitudes and raised the reading scores of 40 high-school sophomores two and one-half years in one semester as reported by Gibbs (209). Similar results were secured by Anders (171) in the ninth grade, and again by Squire (284) in the twelfth, in an investigation in which the presence of a classroom library distinguished the experimental from the control group. Reading habits engendered by informal classroom discussion of books on the basis of standards set up under careful teacher direc-

tion were studied by La Brant (237) for the same pupils over a period of three years in the senior high school. The investigation is suggestive of a type of evaluation often neglected and urgently needed in extensive reading programs today. By means of checklists of standard as well as current novels, supplemented by tests and personal data, Harrington (223) found among library school students evidence of need for more extensive reading in both high school and college. Hoole (229) pointed to a similar dearth of leisure reading as opposed to curricular requirements among college students.

### Reading Interests

Investigations content with mere recollection of titles or reminiscent statements of preferences for books read in previous years are omitted here because findings therefrom have been superseded by more objective studies. Cleary (193), analyzing a semester's reading in a junior high-school library, found old favorites in juvenile fiction predominating in popularity. The New York City Association of Teachers of English (190, 261) secured detailed evidence concerning teacher influence and popularity of books and authors in a study of reading records of 46,000 senior high-school pupils. Reports of committees appointed to study the situation further (262) included evidence on the "book famine in secondary school libraries" and procedures in common use in directing the reading of newspapers and magazines. Peterson's study (267), of the voluntary reading of books and magazines among senior high-school pupils, corroborated the findings of previous investigations. Royster (274) found seniors in high school reporting the reading of significantly better books than freshmen.

Malchow (251) went beyond the question of what books junior high-school boys and girls like best, to make a much needed analysis of the actual elements of appeal in books so selected and their relationship to the known characteristics of adolescence. Foster (204) likewise made a significant study in a comparatively new field. After studying the relationship between reading choices, socio-economic status, and the like for 15,285 adults and high-school students in sampling areas around Chicago, she presented a scale of 16 categories of fiction read by people of varied status, graduated into six levels from cheap fiction of a most inferior type to highly significant novels. As such measures are perfected, they should aid materially in establishing objective means of evaluating one element in the results of extensive reading programs.

Wells (311) studied the tastes of junior and senior high-school pupils for humor by means of an objective test with weighted rankings for slapstick humor, absurdity, satire, and whimsy. The higher their cultural level and the greater their maturity the more preference pupils revealed for satire and whimsy. Persing and Sattley (265) studied the individual reading needs and interests of maladjusted pupils in an industrial community. Witty and Lehman (316) found superior children read more than the average pupil and developed definitely in their taste for better authors.

Sex differences paralleled those of other children. Carnovsky and Johnson (186, 188) found a close relationship between reading activity and scholastic standing among graduate students patronizing the International House Library in Chicago. B. L. Johnson (234) similarly studied reading habits and tastes of women students in the Stephens College Dormitory Library. In general, Carnovsky (187) found that adults actually read books on topics they check on interest blanks if such books are readily available.

### **Student Reading of Periodicals and Newspapers**

High-school studies revealed the fact that newspaper reading was for the most part undirected and that cheaper periodicals were read more widely than the more expensive periodicals (190, 261, 267). One group of pupils, asked to check the magazines which they would like repurchased for the high-school library, showed a "healthy and growing interest in desirable magazines" in a school where situations are definitely provided for their use (238). Two investigations (177, 263) furnished evidence to indicate how instruction in the reading of newspapers and periodicals is carried on in American high schools.

Students in one state teachers college reported that students' reading consisted largely of literary magazines and one news digest, with a decrease in the reading of current events in the junior and senior years (231). Results on a current affairs test revealed that students were unfamiliar with major happenings of recent moment.

Most significant among magazine studies are those which propose objective means of evaluating periodicals read or purchased for the library. As a means of doing this, Logasa (243) compared standard lists for common titles, Eells (199) secured ratings by 200 qualified judges, and Morgan and Leahy (256) obtained judgments of 50 highly trained readers concerning the levels of cultural content in 74 commonly read magazines.

A survey of the place and value of the high-school newspaper in public and private secondary schools accredited by the Southern Association of Colleges and Secondary Schools revealed interesting data concerning the distribution of space, type of humor, educational value, and financial status of such school organs (278).

### **The School Library**

The service of the school and college library has been sketched in several studies already referred to, such as those by Carnovsky and Johnson (186, 188), B. L. Johnson (234), and Cleary (193). Adams (168) presented data concerning administration and use of books in the libraries of selected junior and senior high schools. Limitations in book supply were indicated in the studies of the New York City Association of Teachers of English (262). Horsfall (230) found that students who come to college from high schools with adequate libraries used the college library more than those from high schools inadequately supplied with books. The latter, however, read and purchased more books.



## **The Improvement of Reading and Study Habits**

Daily exercises in comprehension and appreciation of literature for one semester brought benefit especially to poor and average readers in the ninth grade according to G. E. Miller's investigation (252). Thorndike (294) presented evidence of the paucity of material in readers as contrasted with wide reading of individual books, and of the need of more materials adapted to average and low ability groups. Salisbury (275, 276) demonstrated the efficacy of training in outlining as an aid to reading in high school and college.

At the college level, Corey (194) found no improvement in note-taking as a result of *How to Study* lectures unaccompanied by application. Mulroy's results (257) were inconclusive. Deal (197), Broom (182), and Wagner and Strabel (308) presented data on the superiority in academic success of students in *How to Study* groups. The difficulty of demonstrating relationship between the two was recognized by all of them. Woodring and Flemming (317) summarized recent findings in the field of reading and study.

## **Studies in Remedial Reading**

Studies of remedial reading vary from the mere setting up of drill exercises on the technics of the reading examinations to broad and intelligently conceived investigations of reading skills and of the relationship of the whole program to motive, to individual needs and interests, and to broad reading purposes. Definition of aims, care in diagnosis, variation of methods in terms of both, and a consideration of the statistical significance of differences characterize the more important studies. Barry and Pratt (176), Paton and Pierce (264), Walcott (309), McCallister (245), and Traxler (300) all showed considerable gains at the high-school level as a result of diagnostic and remedial procedures in reading, the last even in the hands of an inexperienced teacher. McCullough (249) found progress varying greatly with the individual. Center and Persons (191) studied variation in reading ability in a large metropolitan high school, and produced valuable evidence of the success of a remedial program based upon motivated reading of normal, interesting content and directed recreational reading adapted to individual need.

Similar studies by Gray (213), Reeves and others (270), Gerberich (208), Warburton (310), and Moore (254) suggested the possibility of significant growth in reading power under proper direction at the college level.

## **Analysis of Difficulty of Reading Material**

Thorndike (294), studying the vocabulary burden and reading difficulty of books for pupils of average and low ability in the elementary and junior high school, presented a plan for simplification of materials as to vocabulary and complexity of sentence structure. Gray and Leary (214, 215)



have developed an index of readability for 350 books on the basis of difficulties observed among adult readers of limited ability. Content, style, and format were considered as well as technical difficulties in language. Dale and Tyler (196) and McClusky (248) corroborated the findings of Gray and Leary regarding the importance of average sentence length and the proportion of hard and easy words as determiners of difficulty. McClusky added type of content also.

### **The Study of Reading Rate**

Four studies of reading rate at the college level revealed a high relationship between speed and comprehension (172); marked improvement in rate on the basis of regular self-administered drill (239); the value of preliminary skimming (246); and the dominance of speed over comprehension as a determinant of superiority in reading tests (273). High-school studies show the absence of sex differences in rate (302), and a direct relationship between reading rate and speed of association (301).

### **Photographic Measures and Visual Tests for Deficiencies in Reading**

Tinker (298), in a summary of the work of ten or more eminent psychologists, stressed the fact that eye movement patterns reflect but do not cause efficient or poor reading performance. In a series of individual studies (295, 296, 297, 299) he presented evidence concerning perception time, fixation and regression frequencies, pause durations, size of print, and intensity of illumination, as related to habits and efficiency in reading. Uhl (305) demonstrated the effectiveness of the Keystone Ophthalmic Telebinocular Apparatus in detecting visual deficiencies. Swanson and Tiffin (292) reported the students' performances on Betts's tests of visual sensation and perception were not related to differences in reading ability among college students. Blake and Dearborn (178) and Buswell (184), working with a representative sampling of 1,000 adult readers, studied factors which differentiate good from poor readers at the adult level. Buswell found simple remedial measures distinctly successful with adult groups.

## CHAPTER VI

### Foreign Languages<sup>1</sup>

JAMES B. THARP AND KATHERINE S. McDONALD

THREE RESTRICTIONS are imposed on the authors of this report: (a) the time covered is four years, beginning with December 1933; (b) the categories of content are "methods" and "psychological factors"; (c) the studies must be *research*. It is inevitable that successive groups of reporters, and even those preparing one issue, should vary in their conceptions of what constitutes research. Explanation is necessary of the rather stringent standards set by the writers which have operated to exclude most of the published articles of the past four years.

McDonald (332), with the advice of members of the Bureau of Educational Research, Ohio State University, recently prepared a set of criteria for identifying research and applied these criteria to all the articles published within the past ten years in the four journals, *French Review*, *Hispania*, *Monatshefte für Deutschen Unterricht*, and *Modern Language Journal*. The criteria follow:

I. *Problem*—(a) Is it significant? (b) Is it well stated? (c) Is it related to previous studies? (d) Is it appropriately analyzed? II. *Investigation*—(a) Are the data complete and adequate? (b) Have rigorous technics been used? III. *Conclusions*—(a) Are they logically justified by the data? (b) Are they completely related to the problem? (c) Is the report well written?

Four types of research were identified: experimental, statistical, normative-survey, and historical.

Out of the several hundred articles analyzed for the ten years 1928-37, only 76 met the foregoing criteria for research. Twenty-seven of these 76 articles were concerned with all modern languages in general, 28 in French alone, 10 each in German and Spanish, and 1 in Italian. The most popular subject was "Testing" (18 cases) followed by "Methods" (14 cases); only three articles dealt with "Psychological Factors." The types of research represented were: experimental, 33; statistical, 23; normative-survey, 18; and historical, 2.

Only eight articles of the 76 were published within the time limits of this report. Five other articles appearing in the fall of 1937, three on methods and two on psychological factors, have been judged as satisfying the criteria. These thirteen articles form the basis of this review.

Feder and Cochran (327) published a study of their method of individualized instruction, designed to facilitate each student's learning at his natural level of ability and at his best rate of speed. In the experiment the classroom was made into a student-centered laboratory where assignment

<sup>1</sup> The person appointed to review Latin did not submit a report.

sheets furnished guidance, supplemented by the services of a roving supervisor or helper, and where progress was measured by self-administered, self-checked examinations. The experiment is mainly concerned with the technics of the approach to the skill of reading.

Blayne (320) reported a "prose laboratory" method at Carleton College designed for the purpose of giving the students a solid grasp on the fundamentals of the language. Beyond a means of overcoming a serious difficulty, the method created greater interest on the part of the student and provided for adaptations to the individual.

Brady (321) is also concerned with the needs of individuals in an article characterized by "how-I-do-it" material along with some earmarks of research. The sequence of steps in a four-year college for girls using a reading approach to literary and cultural knowledge, with conversational skills, is described and documented by some of the successes of the students who go thru the program.

While the Brady article is concerned with the effectiveness of the total program rather than the success of the reading approach, research is continuing on the latter problem. Geyer (328) experimented with "minimum" grammar and extensive reading in certain high-school classes to make the reading objective an actual fact. He felt that pupil interest was aroused by more reading and that achievement was increased. Koischwitz and Hurd (331) compared the results of an "interpretative" reading method to those from the usual translation method. While the small difference favored the experiment, the number of cases was too small for conclusion. The authors feel, however, that it is actually a gain that interpretative reading proves no less successful than translation.

Three articles make comparisons of the results of method as determined by quantitative data. Peters (336) repeated Pargment's comparison of the direct method with the grammar-translation method. It must be remembered that there are infinite variations possible in methods called by the same name and there is no assurance here that the Pargment and Peters conceptions of these methods are the same. Two groups, equalized as far as possible, were used to determine results obtained in elementary French teaching through the application of the direct and grammar-translation methods. Certain standards were fixed and several tests and calculations were made and used in the experiment. The conclusions drawn show certain advantages for each method. The grammar-translation method indicates concrete progress in the early stages, while direct method shows more achievement at the end of the year and a tendency toward a greater reading ability.

Two other studies are more general in nature. Remmers and Fotos (338) represent an educationist-teacher team that studied searchingly the effect of methods at Purdue University, as reflected in test results. Certain experimental data are presented on the interrelationships of language abilities as proof that the pattern of such ability develops as a whole. The study of Wrightstone (341) compared practices in selected standard-type and newer-type public schools. By the measurement of certain intellectual factors, he hoped to appraise the newer-type practices of instruction. He reported that

practices based on the recommendations of the Coleman report lead to higher achievement on standardized French tests.

Two recent articles treat of an educational infant, the radio, which is howling to be used, to the dismay of unimaginative pedagogs who do not know where to take hold. Meiden (334) described his procedures in teaching French over Station WOSU, and presented interesting data on the students who took the course, and on the type of work they did. The report omits reference to other studies. Certain statements of principle are assumptions or matters of opinion, rather than the result of research. While containing much of the *credo* type of report, the article makes an important step in the search for a satisfactory method of radio instruction.

The other article, by Cabarga (322), Meiden's Spanish colleague, completed the picture at this radio station. Insisting less on pedagogical principles, and making no comparisons with other broadcasting technics, the article recited the experiences (some humorous) of a language-lesson broadcaster and presents some tests and some results therefrom. The lecture course in English, "Latin America," illustrated by orchestral programs, offers a pattern for a valuable educative force within the reach of many members of the language-teaching profession.

A study in prediction of language achievement was reported by Matheus (333). The George Washington University Series Language Aptitude Test and the Psychological Examination for High School Graduates and College Freshmen of the American Council on Education were given to 103 freshman students in beginning French, German, and Spanish, at West Virginia State College. The coefficient of correlation between scores on each test and semester grades was about .41, and between scores on various tests, about .66. The predictive value of intelligence tests for success in language study has been repeatedly found to be low ( $r = .30$  to  $.40$  with grades), but aptitude tests have been somewhat higher ( $r = .55$  to  $.65$  with grades).

There can scarcely be too many studies on the perennial problem of the effect of foreign language study on English, so the article on high-school spelling by Gilbert and Loofbourow (329) is welcomed. The study is designed to determine the relationship between the ability of high-school pupils to spell English words and their ability to spell words in the foreign languages. The results show that where no spelling instruction is given, improvement in English is much greater than in the foreign languages; that as maturity in languages increases, variability in spelling decreases. There is a definite relationship between performances in English spelling and in foreign language spelling.

The last article does not present new data but applies the research of the famous Russian, Pavloff, on *conditioned* and *unconditioned reflexes*, to the psychological problems of language learning. Posdunin (337), of Dnepropetrovsk, U.S.S.R., studied the theory of *irritants* and *reflexes* as applied to pronunciation, vocabulary, and semantics. The article must be read for the intriguing arguments to support such statements as: "A purely oral course is practically impossible even for the first year"; and "The indirect bond is no less reliable than the direct bond."

Recent bibliography, brought down to March 1937, is contained in the revised edition of the methods textbook of the late Robert D. Cole (323). A new chapter, entitled "Research and Experimentation in Foreign Language Teaching," was added to the revision; it deals with research surveys, curriculum revision, vocabulary, radio, and civilization tests. The most important bibliography of recent material is now in press: *Analytical Bibliography of Modern Language Teaching, 1932-37* (325), which will bring down to date the references of the earlier volume (324) which covered the years 1927-32. It is a project of the Committee on Modern Languages of the American Council on Education.

### Research in Progress

A recent nationwide survey (340) of foreign language research projects in process was based on 5,500 questionnaires, 907 of which came back, 207 reporting research in progress. Each report was entered on a card giving place, investigator, language, date started, problem, and publication, if any. Each project was classified within one of seventeen categories. This file of nearly 400 entries (including the results of two previous surveys) is now being organized and will shortly be published in the *Modern Language Journal* as an "Index of Research." The Committee on Modern Languages of the American Council on Education will undertake to distribute reprints to workers and directors of research. It is hoped that the Index will bring into contact investigators of kindred interests, prevent waste and duplication of effort, and inspire renewed activity among the rank and file of the profession, especially the teachers in service.

The seventeen categories used in the classification of research projects are given in the accompanying table, in the order of frequency of occurrence of projects under way:

1. *Course Planning*: Unification of aims, minimum essentials
2. *Methods*: Reading, individualized, group, aural-oral, etc.
3. *Reading*: Testing, materials, teaching technics, values
4. *Vocabulary*: Technics, devices, lists, testing, control
5. *Testing*: Technics, placement, progress, achievement
6. *Teaching*: Teacher-training, surveys, practice procedure, results
7. *Special Courses*: "Survey," "honors," "scientific," etc.
8. *Foreign Contacts*: Overseas study, radio, films, "realia"
9. *Oral-Aural Training*: Aids, time values, methods, stress, testing
10. *Psychological Factors*: Forgetting, correlations, processes, aptitudes
11. *Phonetics and Pronunciation*: Testing, methods, stress
12. *Grammar and Syntax*: Frequencies, testing, time values
13. *Language Failures*: Causes, correction, sectioning, etc.
14. *Language Errors*: Types, analysis, correction, prevention
15. *Composition*: Marking, planning, errors, values, testing
16. *General Language Course*: Planning, evaluation
17. *Memory Work*: Types, value, procedures

Not the least hope of the future of research is the work on master's and doctor's theses. In the two *Analytical Bibliographies* of Coleman and Jacques (324, 325) 98 master's and 11 doctor's theses are briefed, and



others are known to exist. More than half of the 109 studies fall in four of the seventeen categories, as follows: Vocabulary, 27; reading, 12; grammar and syntax, 11; and cultural content, 10. Directors of theses which are of research nature should communicate with Algernon Coleman (University of Chicago) for the benefit of listing in a possible third volume.

The *Stanford Language Arts Investigation* at Stanford University, supported by a grant from the General Education Board, is a three-year program which is finding new frontiers and new values in the language arts. One of its phases is the "orientation" course, sometimes called "general language," which is becoming both an appreciation activity to non-performers and a highly economic guidance to actual language registrants. A collection of reprinted articles (330) may well be consulted for research problems and for curriculum planning by school staffs.

It may be noted here that current research problems will always present a more accurate picture of present conditions than those reports which are published. There is and has been much research and experimentation going on which has not been, and may never be, reported in a periodical. Such research is just as significant as the published material for it serves its purpose in the situation for which it is planned. On the other hand, both published research articles and local experimentation are evidence that there is an attempt on the part of educators and administrators to advance and to improve education in the modern foreign language field.



## CHAPTER VII

### Health and Physical Education

EDGAR W. EVERTS

**T**HE PURPOSE of this review is to summarize what appear to be the most significant studies pertaining to the improvement of the instructional program in health and physical education on the secondary-school and college level during the past triennium. From a total of 78 studies examined, 14 were selected for discussion. References to several worthwhile studies which were not summarized because of lack of space, will be found in the bibliography. In choosing specific studies for review, consideration was given to those most valuable in pointing the way for: (a) the improvement of existing programs; (b) further studies of import in this field.

#### Health Instruction

During the period covered there have been few scientific studies reported which deal either with the methodology or the psychological aspects of health instruction. Most of the studies which have appeared are concerned more directly with the organization features of health instruction. Several are to be mentioned because of their value in stimulating more extensive work in this phase of the program.

Rooks (368), in an intensive study of 702 students at the State University of Iowa, found that the type of health instruction received in high school has little effect on the desire for further training in college. He also found little uniformity in the organization of health instruction courses in the high schools of Iowa and made appropriate recommendations for the improvement of present health instruction programs. Health knowledge tests and a specially designed interest questionnaire were utilized in making this study. It is, however, limited to a selected sampling of the educational product of one state.

Ruef (369) made an extensive survey of the organization of the health program in the senior high schools of New Jersey enrolling from 200 to 1,000 and over. She used a combination of questionnaire and interview technics. In part this study revealed the great diversity in the organization of health instruction and the methods pursued by the various schools in health guidance. Definite suggestions were made for more extensive studies of health programs.

Mitchell (363) canvassed well distributed schools as to the advisability of separate versus integrated health courses for high-school pupils. He also secured the opinions of theorists and teachers relative to suitable content for health education. He found that school administrators and physical educators favored a separate course.

## Physical Education

*Physical fitness*—Since the improvement of physical fitness, or health, is one of the prime aims of physical education, it is encouraging to note the emphasis placed on this aspect of the program by investigators within recent years. Indeed many schools are now in the process of reorganizing physical education programs to the end that this fundamental aim may be more effectively realized. In this process of reorganization not only are the results of past research being utilized but further experiment with procedures designed to minister more efficiently to the individual needs of pupils is also in prospect.

Several investigations dealing with physical fitness have been reported. Wrightstone (378), using the Physical Fitness tests developed by Rogers, compared the newer types of practice in physical education with the older types of practice as to their effect in promoting general health. He found that pupils exposed to newer types of practice emphasizing games, athletic events, and self-testing activities showed gains in physical fitness statistically significant as compared to those under older type practices in which formal activities predominated.

Clark (345) showed what can be accomplished to improve the physical fitness of pupils through the redirection of existing programs. Cox and co-workers (348) in the Albany public schools also demonstrated what may be done to protect present health through the proper physiological classification of pupils for participation in athletic activities.

Howland (351) reported the use of physical fitness tests as being highly significant in the individual health guidance of college women.

The work of MacEwan and others (362) with Wellesley College women and that of Cureton and others (349) with Springfield College men in the measurement of postural deviations were fine contributions to this phase of the physical education program. They should stimulate further study in the direction of improving methods in meeting the needs of individuals for improvement in body mechanics.

*Motor ability and skills*—The development of measures of general intelligence and mental achievement in academic subjects has stimulated several workers to investigate the possibilities of devising similar tests in the field of physical education.

The first efforts to measure motor ability were those of Brace and later of Burpee. Both of these tests have been found to lack validity. However, McCloy (360) proposed a test of general motor capacity and also of general motor ability for use with pupils of both elementary- and secondary-school age. Neilson and Cozens (365) arranged achievement scales in physical education covering a variety of activities. This work was based on data gathered from California schools, and has fine possibilities for use in school programs.

*Character and personality development*—The possibilities inherent in physical education for contributing to the development of proper character traits have been exploited for a long time. Up to the present, however,

little research has been done which would direct the efforts of teachers to specific methods for using physical education activities as a medium. McCloy (359), in a study of general elements in character as applied to the physical education program, concluded that a number of character qualities may be reduced to three common or fundamental elements. He proposed the rating of pupils in these fundamental traits as being the most economical of time and productiveness in accomplishing desirable results. Blanchard (343) and O'Neel (366) reported the application of a technic proposed by McCloy in a practical school situation and made suggestions for future developments in this area.

## **Summary**

While considerable research in the field of health and physical education has been done within recent years, most of it has been fragmentary. It is patent that research technics have not been applied as extensively in this field as in the more traditional branches of the curriculum. Very little research has appeared which is concerned directly with the learning process as it relates either to health instruction or the activities of the physical education program.

Most of the research has been concerned with administrative problems and measurement procedure. The work done with tests and measurements has been helpful in suggesting practical changes in methods, particularly in connection with the physical education program. However, there is a real need for further experimentation and study of changes proposed by previous researches as well as analyses of existing programs.

## **Needed Research**

There is a definite need for research in health education along the following lines:

1. The establishment of definite criteria for the selection of the activities and materials of instruction for the health education program.
2. A critical analysis of present methods of teaching health information based on intensive study of existing programs.
3. An evaluation of present content material available for teaching health information.
4. A study of the special problems encountered in bringing about desirable changes in the health behavior of children with different racial and environmental backgrounds.

In the field of physical education there is a need for:

1. A study of more effective methods of individual health guidance through the physical education program.
2. A critical analysis of the activities which should be included for normal pupils.
3. The determination of more effective methods of teaching the skills in various types of activities.
4. An analysis of the various activities as to possibilities for setting up desirable learning situations which will promote social and cultural development.

## CHAPTER VIII

### Home Economics

BEULAH I. COON

**I**N THE PAST THREE-YEAR PERIOD the studies concerned with methods of teaching home economics have been carried on by experimental, survey, descriptive, and historical technics and have dealt with methods being used in home economics as a whole or with certain phases of it, such as family relations, foods, and consumer-buying. Some studies have been confined to a study of specific methods, such as the home project, illustrative material, or the radio, while others have been concerned with the development of technics for measuring certain types of outcomes. Although the research technics are becoming more objective, there is still a preponderance of studies that are subjective in type, which tend to draw conclusions on inadequate data.

#### General Studies of Methods of Teaching

Kent (402), in studying the results of planning for home economics programs in 12 southern states during the fifteen-year period 1917-33, included a historical chapter of conditions prior to 1918. Data in the five series of state plans and three series of reports critically analyzed showed a trend in methods of instruction in home economics toward combined laboratory and discussion periods, emphasis on individual needs and on home problems as a basis of instruction, the use of supervised observation, and an increase from one in 1922 to all 12 states in 1929 in the policy of supplementing classroom instruction by home project work.

Three studies dealt with teacher education programs. One (423), carried on cooperatively by the supervisor of home economics and four itinerant teacher trainers over a four-year period, analyzed eight types of difficulties found among home economics teachers they visited, the causes of each, and evaluated the effectiveness of means they were using in helping teachers.

A questionnaire (390), returned by 471 alumnae of colleges of home economics gave their reactions to courses which they had had, and revealed that college methods of teaching needed improvement. The use of community and home experiences in a city, in a rural community, and in foreign countries, is being experimented with by one college to develop an understanding of different types of homes and ability to meet the problems of home life basic in teaching this subject (403). An analysis of questionnaires from 49 institutions resulted in a description of nine methods used to develop personality as an asset in teaching home economics (416).

A case study (395) described a plan of organization for teaching home-making as "an integrated program" where the school apartment was used as a home center and each pupil given opportunity to assume different types

of responsibility for family groups, for young children, and for guests. Skill drills, tests, and the development and checking of goals supplemented the use of problems as methods of teaching.

Basic guides for methods of teaching are being made available from the careful case studies of interest and activities of adolescents by M. C. Jones (398) and Zachry (428). The interest in approval of contemporaries, of members of the opposite sex, and the relation of the earlier social awareness of girls than of boys, and the importance of the family, school, and community influences on the adolescent, are significant to all educators but especially to teachers of family and social relations. An analysis (418) of the problems collected by interviews with pupils in one high school resulted in a classification of these under clothing, health, personality, recreation, social and family relationships, finance, nutrition, friendship, study, and vocations.

Two master's theses in which time charts were employed for classroom observations, threw some light on the way time was used in laboratory, in discussions, and in field trips (394, 426). The amount of time found to be used in routine in certain types of classes and in "non-productive" as contrasted with "productive" activities suggests the need for similar studies of activities of teachers in service to compare with these classes of student teachers.

### **Study of Specific Methods**

Three studies, all dealing with foods, were carried on as controlled experiments. The demonstration and the laboratory method were compared in teaching food preparation, meal planning, and serving to two comparable groups of eighth-grade girls who had had a semester of food preparation previously (386). The cost of food was appreciably lower, the management shown in the practical test at the close of the experiment greater, and the scores on the objective test higher for the group taught by the demonstration method. The quality of foods prepared by both groups was similar. A practical test was not given at the beginning, and attitudes of pupils were not measured. Stevenson (419) worked on an important problem comparing two types of organization for presenting a foods course to comparable groups. Succeeding studies need to use more reliable tests. She found no significant differences though the logical organization seemed slightly superior in one respect and the psychological organization around meals somewhat superior in other respects. Patterson (409), studying assignment sheets with two comparable groups in mixed classes of senior high-school boys and girls, found slight differences in the results among the girls, but the establishment of levels of assignment to provide motivation, as contrasted with one minimum for accomplishment, was more effective with the boys.

Another method, the home project, used frequently in home economics, was studied by three candidates for the master's degree. Two (405, 411), studying the effect of home project work and means of interesting pupils in



this opportunity, used procedures in collecting data which were too subjective to insure accuracy. The other, (417), experimenting with the development and use of devices for reporting home projects, found a checklist and an alternate-choice list to be of interest to both pupils and teachers, and to be more discriminating than the narrative form.

Two master's theses dealing with the use of the radio for teaching home economics—one a questionnaire study (412) and the other (407) an analysis of the programs of one college station over a two-year period—revealed a need for more careful study of this problem.

Four studies dealt with advertising material. One, by a committee (415), set up criteria for evaluating the educational value of commercial and non-commercial materials. Winkelhake (427) secured the evaluation by specialists of approximately 300 advertising booklets used by teachers of home economics. In a large proportion, questionable, false, unsubstantiated, and misleading statements were found, and many failed to give such bases for judging accuracy as the author, date of publication, and exact references for data used. Another study (379) made available a compilation of low-cost teaching materials in consumer-buying, budgets, and account keeping. The fourth (404), using largely secondary source material, gave the findings regarding the extent and results of radio advertising of foods, drugs, and toilet goods from 1927 to 1932 and quoted statements made over the air which are conflicting and misleading to the buyer. The relation of equipment to objectives and possibilities for teaching homemaking was described and illustrated in a bulletin which, though not a result of research, used studies and experiences in a wide variety and types of situations which need to be met in various sized schools, kinds of communities, and programs (380).

*Methods of teaching certain phases of home economics*—The American Home Economics Association has been largely responsible for the *Pictures of Family Life* (413) selected from descriptions by high-school and college students and made available as case studies to use in teaching family relations. A manual on *Teaching Family Relationships in the High School* (414) to accompany *Living Together in the Family* (389), both prepared by a field worker of the Association, though not sent out as results of research, contained conclusions from work with high-school teachers in all parts of the country with whom possibilities and accomplishments by different procedures had been studied. The results of some committee studies and an investigation of what was being taught in consumer-buying in home economics classes in various sections of the country were incorporated in a bulletin for secondary-school and adult classes; source material included suggestions for content as well as pupil experiences and a bibliography (387).

Two historical reports (388, 421) dealt with the development and use of nursery schools as observation centers in teaching child development. An experiment with a method of handling large junior high-school classes in foods offered an interesting suggestion for a more controlled study of the effectiveness of such a procedure (391).



## Development of Means of Checking the Effectiveness of Methods

Much research dealing with methods of teaching has been delayed or has been inadequately done because there have been so few means which are valid and reliable developed to use in comparing results obtained by one method or another. A helpful bulletin by Brown (385) included an evaluation of some tests available in home economics. The progress in testing euthenics at the University of Minnesota (383) is of special interest to those teaching beginning college students. A cooperative state program among teachers, the university faculty, and graduate and undergraduate students is developing, for certain objectives, measuring devices which are valid and practical to administer; those dealing with clothing and textiles, and with consumer-buying have had special study (397, 400, 406).

Four unpublished studies (381, 396, 410, 422) dealt with the use of means of measuring outcomes of clothing work. The technic used by Vaughan (422) is helpful where exhibits can be set up to judge ability to select appropriate and becoming clothes and give reasons for their selection. Paulson's study (410) of immediate and delayed effect of instruction in clothing is suggestive for measuring memorized facts, and the ability to judge quality in construction technics. Hickey (396) developed scales reliable for teaching and testing purposes in analyzing steps in the process of making three types of clothing construction finishes.

In two communities the use of interviews was tried with homemakers who had had home economics in high school and those who had had no home economics, to determine awareness of clothing problems, use of reliable guides in selection and ability to do independent work in solving clothing problems, food buying practices, and interest in keeping up to date on food problems (393, 408). Dietary records were used to compare food habits of adult homemakers, and of high-school pupils, some of whom had had home economics instruction and some who had not (382, 399). The tests of ability to plan, prepare, and serve meals used by Westervelt (424) dealt with important objectives but needed further refinement for reliability and validity. Brown and others (384) and White (425) found that judgments of contrasting photographs dealing with good and poor design and arrangement in houses and house furnishings were highly reliable.

Tannahill (420) worked on the formulation of a scale of interest for use with high-school girls in checking certain of their personal qualities. Some evidences of internal consistency were found but the scale needs further checking for validity and reliability before use. Kellar (401), using the Thurston technic, constructed a scale to measure attitude toward any home-making activity. Another scale was developed by Freidheim (392) to check 21 attitudes of high-school girls studying home economics, toward certain personal, social, and economic problems. The attitudes found and the effect on the attitudes of such factors as intelligence, socio-economic status, size of community, brothers and sisters, maturation, were studied for 664 pupils.

## Summary

The past three-year period has shown some improvement in the objectivity of the studies carried out in methods of teaching home economics. There has been an increase in the use of experimental procedures under carefully controlled conditions; case studies have appeared; too many hastily constructed questionnaires are still used; progress is apparent in the variety of means used to measure results and there has been an increasing recognition of the need for considering generalized outcomes of learning. There have been a limited number of studies dealing with interests of students, with difficulties or errors in learning, and of methods of teaching. Reports of studies show a limited recognition of the psychology and mental hygiene involved in given procedures, and too frequently the investigator has dealt with isolated parts of the job of teaching without recognizing that often previous research concerned with similar problems needs checking in order to establish a suitable basis for subsequent research.

## CHAPTER IX

### Industrial Arts

ELMER W. CHRISTY

URING the period of this review the psychological aspects of industrial arts have been apparent by implication rather than by direct consideration. It has been a period of rapid expansion and enrichment, and present indications are that the peak has not been reached. Literature in the field of industrial arts has been largely confined to magazine articles and graduate theses. Of the latter, the number has increased rapidly as more teachers have entered the graduate field. From these magazine articles and theses, one can appreciate the increasing acceptance of industrial arts as an important field in general education.

#### Objectives

There appears to be a newly aroused interest in objectives. There is a questioning of practices, an effort to enrich the program, and particularly to avoid overspecialization. Angelbeck (429) examined records to discover the development of a program of industrial arts in Milwaukee; Williams (491) analyzed fifty courses in junior high schools for objectives and practices; H. J. Smith (484) discussed class or shop management as an aim, stressed "general-education concept," and urged more emphasis on information.

Voth and Hunter (489) compiled a report of statements of objectives in books, bulletins, periodicals, and published courses. In one of the few books published, Bawden and others (435) presented a comprehensive review of achievements in industrial arts in a report to the Manual Arts Conference of the Mississippi Valley. This report contains much of a historical nature and an interesting statement on trends, but on the whole it is not as forward-looking as Ganders (452) and Moffitt (467), who look to industrial arts to point the way to a new concept of education for the masses. Christy (445) called upon training schools for industrial arts teachers to develop a broader conception of the function of industrial arts in general education.

#### Methods

The use of instruction sheets to supplement or supplant the lecture method or demonstration method of instruction has received much attention in the field of industrial arts. To those who have not followed this development closely, we should point out that instruction sheets are subdivided into operation sheets, information sheets, job sheets, and analysis or procedure sheets.

Bailey (432) and Fletcher (450) surveyed a number of schools to discover the prevailing methods used. Bullen (440) and Curran (447) conducted experiments to compare demonstration methods with the use of instruction sheets. London (461) distinguished between and compared job-sheet and operation-sheet methods of teaching. McCoy (463) experimented with two classes to determine the value of pupil notebooks in teaching the subject of electricity. Fahl (449) studied the psychological factors, qualifications needed by teacher and pupils in developing a plan of school shop management designed to stimulate boys' efforts.

Wiebe (490) studied the prevailing methods of teaching industrial arts in exempted villages of Ohio. Baker (433) studied the effects of production on the educational program of school printing shops. He emphasized the need for better and broader objectives.

Folck (451), Rose (482), and Schade (483) studied various methods of teaching mechanical drawing, including the use of instruction sheets as supplements to demonstration of drawing technic including hand lettering. Bryant (439) compared the use of information sheets and the lecture-discussion in teaching information related to shop subjects.

Knight (457) reported on a comparison of two methods of teaching related information pertaining to metal work, and Petry (473) reported on industrial arts class trips to industrial plants. J. E. Smith (485) reported his experience in teaching drawing by the individual method. Riley (480) made a study of the content and method of teaching woodwork in twenty-six junior and senior high schools, and Stoner (488) presented an example of the Selvidge technic of analysis applied to elementary woodworking on the junior high-school level.

### Enrichment

Much has been said and written about enrichment of the industrial arts field by widening the range of experiences, by emphasizing more the value of our heritage of the arts, and by correlation with other school subjects, particularly with fine arts and science. Concurrent with this development has been that of the general or diversified activity shop in which as many as ten or a dozen kinds of activity are in progress simultaneously under the direction of one teacher. The latter situation demands new methods of teaching. Some idea of the extent to which enrichment is advancing may be gathered by referring to the following references.

Carver (444) surveyed general shop courses of study in junior high schools to discover units of instruction, textbooks, equipment, as well as objectives and methods of instruction. Mann (465), Campbell (443), and Nicholls (469) surveyed subjects taught and general surroundings of industrial arts teachers in New York state and in Ohio. O'Neill (472) studied the informational content of senior high-school industrial arts courses in Wisconsin. Brown (438) suggested the enrichment of industrial arts through reading. Pierson (474) recorded the mechanical activities and interests of boys outside of schools, Stephenson (487) recommended a wide range

of activities in school shops, and Steiner (486) studied the industrial arts clubs in schools of central Ohio. Reed (478) reported the effect of school shop training on handy-man abilities in adult life. Oakland (470), in his master's thesis, made an exhaustive study of the graphic arts, particularly in the field of printing.

Lerda (460) recommended a closer correlation of fine and industrial arts. Inge (456) found a recognized need for fine arts in industrial arts, but very few textbooks which tell how it should be taught. Ramsdell (477) studied the creative manual activities among high-school pupils during free time.

### **Safety**

The attention which is being given to safety education as a part of the general school program has tended to emphasize its importance in school shops. Hornung (455), Pitcher (475), and McGuire (464) developed programs for accident prevention, and to teach safety and first-aid essentials in industrial arts shop classes. Richardson (479) studied all kinds of school accidents and recommended safety education in all branches of the school curriculum. In Richardson's treatment, the industrial arts shop is just one element of the whole safety program.

### **Selecting Textbooks and Equipment**

Another element having as much relation to methods as to content is the evaluation of textbooks and shop equipment to determine how they may be used to the best advantage. Cope (446) and Larrick (459) presented studies in the fields of metal work and ceramics. Barron (434) studied sixteen books on mechanical drawing, and McConnell (462) compared mechanical drawing textbooks of two different periods to determine changes. Hayden (454) compared the use of silent moving pictures with the lecture method for teaching industrial arts. Applegate (430) developed criteria for the selection of power driven woodworking machinery, and Landis (458) made a critical study of woodworking machinery used in junior high schools of California.

### **Graduate Study**

Burgett (441) studied the salient factors pertaining to graduate study in industrial arts. Hankammer (453) revealed considerable variation in practices of institutions offering graduate work in industrial arts, and Ashley (431) found little agreement in requirements for majors, minors, and academic work in various institutions training industrial arts teachers. Mead (466) made a study of teaching problems common to new teachers of industrial arts.

### **Trends**

Cushman (448) discussed the effect of present social and industrial organization on vocational education practices, and Murphy (468) favored

the high-school plan for vocational education in preference to separate vocational schools. Roberts (481) and Calvin (442) studied the trends in high-school industrial arts.

In general it appears that industrial arts is destined to play an increasingly important part at all levels of the educational program. Much of the activity program in elementary schools involves industrial arts, particularly the kind of industrial arts developed by Bonser and Mossman (437). In junior and senior high schools, particularly in small schools, the demand for a program of diversified industrial arts experiences is being met by the development of general shops or laboratories of industry. There is an increasing interest in industrial arts courses for girls.

These are all natural developments in a situation such as Rainey (476) described, wherein youth under eighteen years of age can no longer find worthwhile employment. Increased enrolment in high schools has developed as a natural consequence of the lack of occupational opportunities for youth. Evidence of the desire to meet the problems of this increased high-school enrolment is shown in the Ohio High School Standards of 1937 (471). The enriched programs outlined in this publication require that two or more units of industrial arts shall be offered in all first-grade high schools. This is twice the amount previously required. The psychological concept of learning by doing is thereby recognized, and the problem of finding appropriate methods of teaching is accentuated by the demand for diversification and the recognition of individual interests.

No report on the literature and studies of industrial arts would be complete without reference to the recent book by Bennett (436), in which he traced the development of manual training and manual arts between 1870 and 1917.



## CHAPTER X

### Mathematics

HARL R. DOUGLASS AND LUCIEN B. KINNEY

**M**OST numerous among the investigations reported in the last three years in the field of the psychology of learning and teaching secondary-school mathematics were those relating to various factors which will assist in the forecasting of success. Evidence has been added to an abundance of data previously reported to indicate that achievement in algebra and in geometry may be predicted with a degree of accuracy quite serviceable in guidance and in homogeneous or ability grouping.

#### Prediction of Achievement in Algebra

Apparently, achievement in algebra may be predicted best by means of the previous teacher's estimate of the pupil's ability to do algebra, and by such prognostic tests as the Lee Test of Algebraic Ability and the Orleans Algebra Prognosis Test. Ayers (492) reported a coefficient of  $.63 \pm .03$  between second-semester marks in algebra and eighth-grade mathematics teachers' estimates of student ability. Lee and Hughes (504) reported a coefficient of .53 ( $N=213$ ) between teachers' estimates and scores made at the end of the first semester on the Columbia Research Bureau Algebra Test, and a coefficient of .62 between scores on the Lee Test of Algebraic Ability and scores on the Columbia Research Bureau Algebra Test. Orleans (507) reported a coefficient of .61 ( $N=113$ ) between scores on the Orleans Algebra Prognosis Test and scores on the Columbia Research Bureau Algebra Test at the end of the first semester. Ayers, on the other hand, reported a coefficient no greater than .40 ( $N=240$ ) between the South Pasadena Prognostic Test in Algebra and teachers' marks in second-semester algebra, and Dunn (496) reported a coefficient of .33 ( $N=223$ ) between scores made on the Orleans Algebra Prognosis Test and scores on the Douglass Standard Survey Test in Algebra at the end of the year.

Intelligence test scores and I. Q.'s are not highly predictive of achievement in algebra. Lee and Hughes (504) reported a coefficient of .56 between Columbia Research Bureau Algebra Test scores at the end of the first semester and scores on the Kuhlmann-Anderson Intelligence Test, and one of .47 between Columbia Research Bureau Algebra Test scores and I. Q.'s compiled from scores on the Terman Group Test of Mental Ability. Dunn (496) reported a coefficient of .24 between Terman group intelligence test scores and Douglass survey algebra test scores at the end of nine months' instruction. Ayers (492) found a correlation of .34 between Terman Group I. Q.'s and second-semester algebra marks.

Other factors found, by the investigators mentioned above, not to be closely correlated with scores on algebra tests were:

New Stanford Achievement Test Scores.....	.37 (N=223)
New Stanford Arithmetic Test Scores.....	.36 (N=223)
Hughes Trait Rating Scales.....	.39 (N=213)
Chronological Age.....	.38 (N=213)
South Pasadena 8A Mechanics Test.....	.38 (N=240)
South Pasadena 8A Reasoning Test.....	.44 (N=240)

By combining two or more variables, greater accuracy in prediction is apparently possible, especially when teacher estimates on previous mathematics grades and algebra prognostic tests are employed. For teacher estimates plus South Pasadena Prognostic Test in Algebra scores, Ayers (492) reported a coefficient of .66 with a combination of scores on the Lee prognosis test with either ratings on the Hughes scale or scores on the Kuhlmann-Anderson mental test. Various combinations of teacher estimates and scores on the South Pasadena 8A Mechanics Test, the South Pasadena 8A Reasoning Test, or Terman Group I. Q.'s yielded multiple coefficients of .636, .638, and .635, respectively. Dunn (496) reported a multiple coefficient of only .42 with a combination of the Orleans prognostic test and the Stanford general achievement test, which was the highest coefficient found in his investigation.

Lee and Hughes (504) also reported material coefficients of correlation between the predicting variables investigated and teachers' marks in algebra, which differed from those with achievement test scores in algebra chiefly in that the correlation of marks was higher with rating on the Hughes Trait Rating Scales and with teachers' estimates of ability to learn algebra. The coefficient of correlation of the scores on the Lee Test of Algebraic Ability with teachers' marks in algebra, .46, was materially lower than with achievement test scores in algebra, .62.

### Prediction of Achievement in Geometry

Coefficients of correlation between scores on the Orleans Plane Geometry Achievement Test and certain variables—scores on the Hughes Trait Rating Scales, Terman Group Test I. Q., Kuhlmann-Anderson I. Q.'s, teachers' estimates of ability to do algebra, and Lee test of aptitude in geometry—were reported by Lee and Hughes (504) as being, with one exception, approximately the same as the coefficients between the corresponding variables and achievement tests in algebra. The exception was in the case of the teachers' estimates (in algebra,  $r = .53$ ; and in geometry,  $r = .34$ ).

As in the case of algebra, achievement in geometry may be best predicted from prognostic test scores and marks received in the previous school year. Richardson (509) reported a coefficient .70 ( $N = 135$ ) between second-semester algebra marks and first-semester marks in geometry as compared with coefficients of .67 with previous mathematics teachers'

estimate of ability to learn geometry, .67 with scores on Orleans prognostic tests of ability in geometry, .63 with first-semester algebra marks, .50 with Terman Group I. Q.'s, and .50 with Iowa Algebra Prognostic Test scores. Hamilton (500) reported a close relationship between marks in 10B geometry and the average marks in ninth-grade algebra and English, finding a coefficient of .63 for one group of 87 students, and .78 for another of 88. Of the first group, out of 12 students averaging C— or lower, 11 of them failed geometry and one received D. Of the other seven failures in geometry, six of them had averaged C in algebra and English the year before and the other C+. Similar results were found for the next group in which eight of the students who averaged less than C failed in geometry.

Lee and Hughes (504) reported a high correlation between scores on the Lee Test of Geometric Aptitude and scores on the Orleans Plane Geometry Achievement Test at the end of the first semester (.63) but not nearly so high with teachers' marks (.31).

Orleans (507) reported coefficients of correlation between his prognostic test for geometry and scores on the Orleans objective achievement test in geometry at the end of the semester as follows: .45, .50, .58, .58, .60, .61, and .65, the number of cases being 120 in each correlation. Sixty percent of the failures were in the lowest fourth on the aptitude test.

Coefficients of correlation between I. Q. and achievement in geometry were reported as follows:

Hummer (502), 153 cases, Otis Group Intelligence Scale, Advanced Examination, with Columbia Research Bureau Plane Geometry Test,  $.58 \pm .04$ ; Lee and Hughes (504), 113 cases, Kuhlmann-Anderson I. Q. with Orleans Plane Geometry Achievement Test at end of first semester,  $.54 \pm .02$ ; Kuhlmann-Anderson I.Q.'s with teachers' marks at end of first semester,  $.31 \pm .09$ ; Terman Group I.Q.'s with Orleans Plane Geometry Achievement Test at end of first semester,  $.44 \pm .08$ ; Terman Group I.Q.'s with marks at end of first semester,  $.26 \pm .09$ ; Richardson (509), 135 cases, Terman I. Q. with first-semester geometry marks,  $.50 \pm .07$ .

In view of the rather wide range of coefficients for single variables and the fairly stable multiple coefficients of correlation, it appears that the only really useful methods of predicting success in geometry, as in other subjects, involve the use of two or more predictive bases. Multiple coefficients were reported as follows:

	<i>r</i>	No. of Cases
Orleans (507), Orleans Geometry Prognostic Test and Otis I.Q.'s	.72	213
Lee and Hughes (504), Lee geometry aptitude test and		
Hughes Trait Rating Scales.....	.67	108
Lee geometry aptitude test and Kuhlmann-Anderson I.Q.'s....	.66	108
Hamilton (500), Algebra and English marks.....	.63	87
Algebra and English marks.....	.78	88

Douglass and Michaelson (495) reported data based on marks of 387 students at the University of Oregon which indicated that the college marks in each of 14 different fields were not dependent upon the number

of semesters spent in the study of mathematics in high school. The highest coefficient of correlation, .28, between number of semester credits in high-school mathematics and average marks in certain college subjects, was found in the case of college mathematics. The corresponding partial coefficient of correlation, with intelligence held constant, was .17.

In the same study, rather low positive correlation was shown to exist between marks in high-school mathematics and marks made in each of 14 different college fields—the Pearson coefficients ranging from .21 in the case of philosophy to .46 in mathematics, and .46 in French, and the correlation ratios (representing curvilinear relationship) ranging from .32 in the case of physical science, to .55 in mathematics.

Douglass and Michaelson (495) also found that college marks in mathematics could not be accurately predicted from data ordinarily available. The highest obtained correlation ratio, .59, was found to exist between college marks in mathematics and average high-school marks in all subjects. The multiple coefficient of correlation obtained between the number of high-school credits in mathematics and average marks in all high-school subjects, was .50. Other coefficients obtained were: college marks in mathematics with high-school marks in mathematics, .46; college marks in mathematics with average marks in all high-school subjects, .47; college marks in mathematics with percentile ranks on American Council of Education psychological examination, .26.

### **Achievement in Mathematics**

From a study of the papers of 9,034 presumably superior ninth-grade pupils in 230 Iowa high schools who took the examination in elementary algebra in the fifth annual Iowa Every Pupil Achievement Testing Program in May 1933, Lindquist (505) concluded that (a) a significant proportion of high-school pupils then taking algebra were incapable of learning enough about it to warrant its being required of all of them; (b) the range in achievement was great enough to render meaningless the requirement of algebra as a means of selecting college entrants; and (c) the content and methods of teaching high-school mathematics were in serious need of reorganization and improvement. Only 10 of the 62 items in the test were answered correctly by more than half of those taking the examination.

Pupils improve very little beyond Grade VII in their ability to perform fundamental operations with common fractions, the total scores in tests given to 623 pupils in Grades VII through XII being: 147, 155, 152, 152, 151, and 162, respectively. The last group—twelfth-grade pupils—included 27 pupils taking algebra. As reported by Gundlach (499) there was little difference among the four processes—addition, subtraction, multiplication, division. There were no distinctive features discernible in the growth curve for pupils of lower, normal, and superior intelligence.

## Sex Differences in Achievement

Findings in the studies by Grossnickle (498) and Foran and O'Hara (497) were in agreement with previous investigations of sex differences in achievement in mathematics. Grossnickle found that boys were significantly superior to girls in the possession of 68 mathematical concepts commonly used in business and commonly found in seventh- and eighth-grade arithmetic textbooks. He used as subjects 1,257 children who were just completing the eighth grade in 10 city schools. Foran and O'Hara equated two groups—a group of 436 boys and a group of 437 girls—on the basis of scores made on the Terman Group Test of Mental Ability, Form A, and compared achievement in geometry on the basis of scores made on the Webb Geometry Test, Form A. The results were as follows:

	<i>Mean</i>	<i>S. D.</i>	
Boys .....	26.75	11.19	
Girls .....	20.33	9.63	
Difference .....	6.42	.71	Critical Ratio..... 9.06

The difference was nine times as great as its standard error and was therefore very reliable statistically. Boys were slightly more variable in achievement than girls.

## Mathematics as a Specialized Ability

Evidence that mathematics does not require a specialized ability was furnished by Dexter (494). The marks of nine groups of students, some in elementary school, some in secondary school, and some in college, were studied. At no level did individual students vary in their mark in mathematics more from their general average than in their mark in other subjects.

As a result of giving short vocabulary tests to 97 first-year algebra students throughout this year, Jackson (503) presented evidence to indicate that poor achievement in algebra is accompanied by a lack of thorough understanding of the meaning of algebraic terms.

## Reading and Algebra

Contrary to the results of a number of other investigations, and the opinion of many writers on the subject, Buckingham (493) found little relationship between reading ability as measured by the Gates Silent Reading Tests, paragraph comprehension, and achievement in algebra as measured by the Cooperative Algebra Test, Form 1933. With 105 ninth-grade pupils, low coefficients of correlation were found between scores on the Cooperative Algebra Test and the four parts of the Gates Silent Reading Test, as follows:

<i>Parts of Gates Test</i>	<i>Complete Algebra Test</i>	<i>Part II Only</i>
A. Ability to appreciate significance of paragraphs...	.30 ± .06	.26 ± .06
B. Ability to predict outcome of given events.....	.71 ± .05	.21 ± .07
C. Ability to understand precise directions .....	.38 ± .06	.39 ± .06
D. Ability to note details in reading.....	.22 ± .06	.11 ± .07



### **Assignment—Workbooks**

Stone (511) reported an experiment by Ramsey (508) in which the latter compared the achievement of two pairs of 8A and 9B algebra groups—one pair of groups using a textbook, the other pair using a combination of workbook (510) and textbook. Experimental and control groups were equated on the basis of I.Q.'s obtained by the Otis Self-Administering Tests of Mental Ability, Higher Examination: Form A. The data reported for the study are not complete enough to permit a critical evaluation of the author's conclusion regarding the effect of the use of a workbook in teaching algebra. The report of the experiment should have included more information about the tests used. With such information an inference might have been possible regarding the extent to which the tests used did or did not favor the experimental groups. No data are presented to support the experimenter's conclusion that the use of a "workbook held the class together better in line of thought."

### **Large Unit versus Daily Unit**

A comparison of large-unit with daily-recitation organization of teaching and learning activities suggested a slight superiority of the large-unit method. Linn (506) employed two groups of 32 ninth-grade pupils of elementary algebra, equated on the basis of Terman Group Test of Mental Ability, the new Stanford Arithmetic Test, and the new Stanford Reading Test. After the first six weeks of the year, Group A was taught by the daily-recitation method consisting of short daily assignments, and daily recitations, including discussions of pupils' difficulties, class drill, and occasional tests. With Group B, large units were employed, involving the following steps: (a) group assignment and instruction for the new needs; (b) supervised study (largely individual) for several days; and (c) group discussion and testing over the unit.

Achievement was measured by means of the Douglass Standard Survey Algebra Tests I and II, Form A, and 12 short supplementary tests. At the conclusion of the first semester a small difference, not statistically significant (critical ratio = .67) favored the large-unit method. Over the work of the second semester, a very small difference (critical ratio = .25) was found in favor of the daily-recitation method. Scores on the 12 short tests were higher for the large-unit group.

### **Reorganized Mathematics Courses**

Wrightstone (513) compared the achievement of pupils in schools in which arithmetic, algebra, and geometry were taught in fused or unified groups, with the achievement of pupils in schools in which those subjects were taught in separate classes. Groups were equated on the basis of average scores made on the Otis Self-Administering Tests of Mental Ability, Higher Examination: Form A. Achievement of paired groups ( $N = 110$ ) in arith-

metic was measured by the new Stanford Arithmetic Test, Form W; that of ninth-grade algebra groups ( $N = 90$ ) by use of the Cooperative Elementary Algebra Test, Form 1933; that of eleventh-grade algebra groups ( $N = 56$ ) by use of the Cooperative Intermediate Algebra Test, Form 1933; that of groups in tenth-grade geometry ( $N = 110$ ) by use of the Cooperative Plane Geometry Test, Form 1933. Only in the case of plane geometry did the group studying the fused course exceed the achievement of a group studying a standard type of course by a difference which was statistically significant. In case of intermediate algebra the difference in achievement was statistically significant in favor of the standard-type group. In both elementary algebra and arithmetic groups the differences were not found to be statistically significant.

### Separate versus Correlated Method in Products and Factoring

Special products, and factoring, may apparently be taught as well by teaching each special product of two given expressions along with the factoring of the product, as by teaching special products of a number of combinations first and later taking up a comparable group of factoring cases. Howland (501) employed two groups of 42 ninth-grade pupils of intelligence slightly lower than average ( $I.Q. = 95$ ), equated on the basis of I.Q.'s computed from scores on the Otis Self-Administering Tests of Mental Ability, Higher Examination: Form A, and measured results by means of eight tests from the *Unit Workbook in Algebra* by Stone and Georges (510) and two more comprehensive tests, one on factoring and one on special products from Hart's *Diagnostic Tests and Remedial Drills in First Course Algebra*. No consistent results favoring either method were found.

### Effectiveness of Remedial Drill

Tucker (512) added to the evidence furnished by previous investigations indicating the usefulness of drill based upon diagnostic procedures. Two groups of 50 students each were equated on the basis of the Otis Classification Test. At the end of thirty weeks the Hotz Algebra Scales were administered. The achievement of the drill group exceeded the achievement of the control group by a reliable margin. Results were as follows:

	Median score of	
	Drill group	Control group
Addition and subtraction (algebra) .....	16.2	13.2
Multiplication and division (algebra) .....	16.4	12.3

The drill done in class periods was continued by each pupil in the drill group until he made no more than three errors on the tests given at the end of each six weeks.

## CHAPTER XI

### Music

JAMES L. MURSELL AND THURBER MADISON

#### Status of Music Research

**E**XPERIMENTAL INVESTIGATIONS dealing directly with music education at the secondary and college levels are not numerous. Hopkins (526) criticized "conventional" research procedures in this field, dealing with narrow and specialized outcomes, and made a plea for the study of the total personal reactions of pupils. Bibliographies, summaries, and reports of investigations in progress were published by Bienstock (515), Bienstock and McDavid (514), Flagg (523), Flemming (524), Kwalwasser (529), Mursell (533), Pierce (537, 538, 539), and Schoen (540). Those by Kwalwasser, Mursell, and Schoen include a number of items relating to the general psychology of music.

#### Music Surveys

Several surveys and reports have appeared dealing with current practice in music education, historical developments in the field, and the place of music in the community (516, 517, 519, 535, 544). Of particular interest is the study of music in the community, offered by the Cambridge-shire Report on the Teaching of Music (517).

The Research Council of the Music Educators National Conference set standards for music rooms and equipment (534) and offered a self-survey scheme for use in connection with school music (536).

Tilson (547) reported a well-conducted investigation in which the Sea-shore Tests were administered to sizable populations of music students and non-music students in a state teachers college. The obtained differences in test performance between the music and non-music groups seem surprisingly large and are not entirely in line with findings in other similar studies. Manzer and Marowitz (532) administered the Kwalwasser-Dykema tests to 500 college students, and reported scores higher than the test norms for elementary-school and high-school pupils, and re-test coefficients ranging from .0511 to .7268. They concluded that while the battery should be used with great caution for individual diagnosis it is serviceable for group differentiation. Larson (531) discussed the testing movement in music in general.

#### Prediction of Success

The most important contribution in the field of tests and measurements is Stanton's monograph (542) on the ten-year experiment at the Eastman

School of Music. A battery of tests consisting of the Seashore Measures of Musical Talent together with the Iowa Comprehension Test was given to all entering students, who were classified into five divisions on this basis. A study of their subsequent achievement in the school revealed that the combined tests possess considerable prognostic value. The classificatory procedure adopted is somewhat unusual, but in the main the work is on a high level of technical competence, and the entire monograph should be studied by all who propose to use the music tests for practical educational purposes.

Lamp and Keys (530) investigated the relationship between certain variables, including I. Q. together with various anatomical measurements such as length and slenderness of fingers, thickness of lips, evenness of teeth, to achievement in learning the brass horns, the clarinet, and the violin. The anatomical measurements seemed to have little predictive value, which is contrary to the assumptions of many teachers of instrumental music.

### **Sundry Studies**

Krone and Wallace (528) employed a questionnaire method to investigate changes in preference for a list of vocal items taking place in 180 high-school pupils during a rehearsal period. Striking changes were revealed, mostly in the direction of musical and artistic excellence. Tilson (546) reported an interesting follow-up study of the professional activities of graduates from a four-year music supervisor's course at a state teachers college, which showed that a majority of them were responsible for instruction in outside fields, most frequently art and English. Earheart and Gatto (520) used the parallel group method to investigate the effect of creative work in music. On the basis of a number of criteria, the experimental group was found to excel the control group at the end of 57 class periods, during which six original songs had been composed. The pairing of the groups, which was done on the basis of the Kwalwasser-Dykema test scores and music class attendance, seems open to question.

## CHAPTER XII

### Science

SAMUEL RALPH POWERS

**T**HE STUDIES reviewed in this article are grouped for convenience under four headings: (a) innovations in classroom methods; (b) scientific attitudes and interests; (c) transfer of training; and (d) curriculum investigations. Only a small number of curriculum investigations have been included and those selected are ones which are related to assumptions concerning processes in learning.

#### Innovations in Teaching Methods

In an attempt to discover better teaching technics for general science, Fox (556) collected and analyzed pupil errors on standardized science tests. Three technics designed to reduce errors in examinations were used in experimental classes. These were technics (a) of demonstration, (b) of stressing major ideas, and (c) of teaching vocabulary. Both high and low intelligence groups in which these technics were applied did better on standardized tests than did groups in which no particular emphasis was placed on these technics.

Several studies in which there was emphasis on methods of developing pupil initiative yielded results favorable to the innovations which were tried. Peterson and Douglass (564), working with equated groups, found that pupils who prepared their own notebooks without the aid of printed workbooks did as well on unit tests, objective semester tests, and on the examinations given by the New York Regents, as did pupils who used workbooks. Barnard and Robertson (550) found pupil-prepared study guides slightly superior to teacher-prepared guides when results were measured on immediate and also on delayed tests. The authors stated, without supporting evidence, however, that the pupil-developed method is more likely to develop skills in problem solving and in ability to apply generalizations. Atkins (549) studied the effectiveness of methods involving a considerable measure of self-direction in attaining the objectives of laboratory instruction in general biology, using in his experiment a number of tenth-grade classes. This is an interesting illustration of a study which bears evidence of a high degree of resourcefulness yet fails to show any advantage of one method over the other. There appears to be a weakness in this study in the methods used for evaluation. In the experimental work, emphasis was on methods of thinking; the instruments used for evaluation, however, were tests of information.

A study relating directly to the elementary school, but of significance to other grade levels, was reported by Haupt (557). The purpose of the study was to test the "objective" or "large generalization" type of aim in



a teaching situation. Objectives were selected through a review of related studies in science education and through a consideration of the needs and interests of children. Learning elements related to these objectives were selected from analyses of books by authorities for non-specialists in which these objectives were treated, and from statements made by children in Grades I to VI. Following the experiences with these learning elements, results were evaluated by means of individual oral tests for children in the first three grades and by means of essay tests in the fourth to sixth grades. The methods used in the study of learning experiences and in making evaluations were often slow and tedious, but the results are a definite contribution in demonstrating how science materials suitable for particular grade levels can be selected and presented to children.

A report by Rice (566) compared results from extensive reading with results from intensive study of textbooks using matched pupils in experimental and control classes. In general the experimental group (extensive readers) excelled to an appreciable degree in general subjectmatter tests and also in tests on articles in magazines. The experimental group read 2.8 times as much as did the control group and its members reported a preference for the extensive reading program.

F. E. Brown and Coons (552) reported a study on the effects of having different instructors in recitation and laboratory sections in freshman chemistry. Data on drops, term tests, final examinations, and final grades were secured for 23,868 students. Of these, 9,098 met the same instructor in recitation and laboratory, while 14,770 met different instructors. In all particulars the records of those who met the same instructor were better than the records of those who met different instructors.

Tyler (569) reported a study conducted at Ohio State University in college classes in botany of the effects of personal interviews between instructors and students. New types of tests were used, designed to measure achievement in a variety of objectives including: (a) ability to recall important facts, principles, and technical terms; (b) ability to formulate reasonable generalizations from specific data of an experiment; (c) ability to plan an experiment to test a given hypothesis; and (d) ability to apply general principles to new situations. The first tests were given in the spring of 1930. Four instructors in first-term botany and two instructors in second-term botany conducted interview sections. Each instructor taught one interview section and two sections in which no interviewing was done. Students chosen for comparison were taught by the same instructor and matched on the basis of sex and percentile ranking in the Ohio State University Psychological Test. Results from the tests showed a difference in favor of the interview group, the difference being much too great to be attributed to sampling. The difference was approximately equal to half the difference between an average mark of C and an average mark of B for the classes involved. For the following fall semester the tests and controls were refined and the experiment repeated, this time in sections in beginning botany and in beginning zoology. The results

were substantially the same as those obtained for the preceding semester. Tyler's conclusion was that the students in interview sections made a significantly higher mean achievement than did corresponding students who were in sections where no systematic plan of interviewing was followed.

A second study pertained to remedial instruction. The zoology department provided a remedial laboratory where students might go for assistance during any free hour. Carefully planned controls were set up and paired students were tested both in information and ability to use scientific methods. The results showed significantly higher achievement on both forms of tests by those who were given remedial instruction.

A third study pertained to the permanence of learning. Students were tested who had taken elementary zoology and who had taken no course in zoology in the succeeding fifteen months. Tests were given at the beginning of the course, at the time of course examinations, and fifteen months later. Results showed that specific information was most quickly forgotten, that information of more general application was more permanent, and that during the fifteen-month period there was no loss in the ability of students to apply important zoological principles to new situations or to interpret data obtained from experiments.

A unique study on individual variation in the use of sensory powers in making chemical analysis was reported by Carleton (553). Tests in judging precipitations and colors were given to a number of college students just finishing general inorganic chemistry, and who therefore might be supposed to be ready to begin qualitative and quantitative chemistry. It was found that (a) the accuracy of observation varied among 50 observers by as much as three to one, (b) the range of variation in observation was twice as much as is desirable in analytical work, and (c) the observation of even the best of observers varied according to a normal distribution. This study, while applying directly only to a limited field, does suggest considerations which should be taken into account in planning all types of more advanced laboratory work.

A study of a different nature from those given above, but at the same time related to methods of teaching, was reported by C. M. Brown (551) at the University of Minnesota. An investigation was made to determine the relative effectiveness of the General College courses in human biology as compared with the more traditional university courses in zoology. Results from tests given showed that students in General College would, as a whole, be classed as having definitely lower potential scholarship than the group of students taking either zoology or physiology, but that General College students paired on the basis of high-school records or pre-test scores did about as well as did the others.

*Critical comments*—An examination of reports on teaching procedures reveals certain points of weakness:

1. In comparing two methods of teaching, both methods, rather than just one, should be considered. Some of the studies, while describing in detail one of the methods used, dismiss the other method by simply calling it "traditional" or "old." In the face

of so many "traditional" and "old" methods of teaching, clarity can be had only by a more complete description.

2. For purposes of comparison, other factors than the experimental one need to be considered, even though effort is made to keep these constant. Any factor in a teaching situation is influenced by its setting with other factors and cannot be clearly considered apart from a knowledge of all the factors.

3. Methods which make a difference are the most fruitful for study. Studies which reveal only likenesses in the results obtained are frequently of questionable significance. If there is really a difference in two teaching methods, it seems fair to assume that the results from these two will not be entirely the same. Failure to find the differences results when measures are used which are inadequate for the purposes for which they are used.

4. Personal enthusiasm for a particular method appears in some cases to be an influencing factor in the evaluation of that method.

### **Scientific Attitudes and Interests**

Several efforts have been made to arrive at a definition of the concepts which teachers hold when they speak of scientific attitudes. Skewes (568) found that 90 percent of the teachers replying to his questionnaire accepted these five characteristics as elements in scientific attitudes: (a) willingness to change opinion on the basis of new judgments; (b) search for whole truth regardless of personal, religious, or social prejudices; (c) concept of cause and effect relationship; (d) habit of basing judgment on fact; and (e) power to distinguish between fact and theory.

Following the philosophy of the Teacher Training Council in Wisconsin, Davis (554) set up, as objectives of science teaching, a number of characteristics of scientific attitudes. These were sent to teachers for acceptance or rejection. The characteristics accepted as objectives by at least 80 percent of these teachers included the five characteristics reported by Skewes, and in addition as a sixth characteristic, "freedom from superstitious belief." These characteristics were accepted by Davis and the Wisconsin teachers as defining a scientific attitude. Two tests were constructed for measuring the extent of existence or degree of attainment of the scientific attitudes by both teachers and pupils. One was a cause-and-effect relationship test, the other a fact-theory test. Results were reported from testing 295 pupils and 25 teachers. Davis concluded from these results: (a) high-school pupils in Wisconsin are not superstitious; (b) high-school pupils make almost as good marks on scientific attitude tests as do teachers; (c) many of the theories in science are being taught as facts by many of our best teachers; (d) pupils seem to have a clear concept of cause and effect relationship, but do not seem to be able to recognize the adequacy of a supposed cause to produce the given result; (e) many teachers propagandize their material without having scientific evidence for the statements they make; (f) teachers do not consciously attempt to develop the characteristics of a scientific attitude. The investigator expressed as his opinion that if pupils acquire scientific characteristics they do so through processes of thinking or experiences that occur outside the science classroom.

Another attempt to define and measure the existence of scientific attitudes was reported by Noll (563). He assumed that scientific attitudes were characterized by or consisted of certain habits of thinking which he de-

scribed as habits of (a) accuracy, (b) intellectual honesty, (c) open-mindedness, (d) suspended judgment, (e) looking for true cause and effect relationship, and (f) criticalness including self-criticism. The results from Noll's work were some tests designed to measure these habits. Some evidence of validity of these tests was found in the observation that the mean scores on them increased gradually from the seventh to the twelfth grade.

An examination of these and other reports on scientific attitudes reveals a weakness common to most of them. In the investigations, attitudes are discussed not infrequently as abstractions apart from or at least not closely associated with activities which are accepted by the learner as significant. In one instance the activity in question may be trivial, in another it may be a specialized activity involving laboratory manipulation. In neither case is there likely to be sufficient challenge to cause the learner "to change opinion on the basis of new judgment," "to search for the truth regardless of prejudices," or to exercise any of the other attributes such as listed by Skewes (568). For success in the study of attitudes which are to be effective in life it seems essential that the activities be accepted by the learner as significant and that they be carried on in a setting that is similar to the broad relationships that occur in life.

A significant study concerned with children's expressed interests has been reported by Fitzpatrick (555). This study is timely because of the discrepancies that have appeared in many reports of investigations of interests. Fitzpatrick's contribution is one in which he showed by direct attack that the methods by which so-called interests of children have been discovered and cataloged were not reliable. Using the technics of different investigators presumed to yield similar results, he found enormous differences in the data which he obtained. The reader must not conclude from Fitzpatrick's report that children do not have persistent interests. It appears though that one may conclude that these interests are subtle and that technics of interest studies have not been sufficiently refined to detect and describe interests.

### **Transfer of Training**

A significant study of transfer was reported by Mudge (561). She attempted to determine the extent to which knowledge of chemistry, as taught in the classroom and laboratory in high school, transfers or is used in the solution of everyday problems of a chemical nature, and in reading and interpreting scientific and quasi-scientific literature. Two types of tests were used, called informational and functional. The experimental group was a high-school class in chemistry. The control was a group not taking chemistry. Results on the tests showed that the experimental group made greater gains on both the "factual-information" and the "functional" tests. The permanence of these gains was measured by giving the tests to college freshmen who had taken chemistry in high school but who did not take chemistry in college. It was found that retention of facts of chemistry was sustained over a longer period than was the ability to apply these facts.

In other words, the greatest losses were in the scores on the functional test. The author concluded from her study that pupils do gain ability to transfer their knowledge of chemistry to the solution of problems in chemistry but that ability to do this is lost more rapidly after instruction has ceased than is ability in factual information as measured by the tests. This conclusion which is in some respects in conflict with Tyler's findings (569) seems rather startling and should not be accepted too literally unless supported by further research. One may, for instance, question the validity of the tests. The assumption that the college freshmen were comparable to the experimental and control classes may also be questioned—yet the validity of the study rests largely on this assumption.

Studies of the effects of courses taken in sequence are in some particulars related to transfer. Johnson (559: 65-104), Noll (562: 83-84), and Hurd (558) at the University of Minnesota found that the first course in a sequence (high-school chemistry or high-school physics before college chemistry or physics) showed little or no influence on ability to score on tests given in the second course. In contrast with this a committee of the American Society of Physics Teachers under the chairmanship of Lapp (560) reported significant differences in the scores on tests given college classes in physics, between students who had and who had not had physics in high school.

### **Curriculum Studies**

A number of curriculum studies have been reported which are related to assumptions concerning the learning process. For example, Arnold (548) has demonstrated how a list of earth-science generalizations suitable to needs and interests of laymen may be selected and analyzed for use in educational work. The generalizations selected were those which suggested educational experiences suitable for the development of ability to interpret the features of the earth surface in evidence within 50 miles of New York City. This is an excellent example of a curriculum study in which the materials for learning experiences are set in broad interpretative generalizations.

Other studies of the same general nature were reported by Pruitt (565), Wolford (570), and Robertson (567). Pruitt reported a list of generalizations in chemistry selected for their value to man in interpreting his reading and his observations. Wolford investigated methods of determining types of content for eighth-grade science in a particular geographical (the southern Appalachian) region. Robertson's work was in the field of elementary school. He secured a list of principles of science suitable as goals of instruction in the elementary grades and then a list of subjectmatter topics that contributed to an understanding of these principles.

### **Summary and Comparisons**

The reports just reviewed have been selected from a list of about 60 studies, most of which have been reported since January 1, 1934. A com-



parison of these with the previous review of studies in psychology and method of science teaching (*Review of Educational Research*, December 1934), shows some striking differences, and at the same time reveals certain trends.

For one thing, the technics used in investigations employing experimental and control groups have been considerably refined. Experimentation has been used to compare laboratory and demonstration methods, unit plan and daily recitation, extensive reading and textbook reading, and other teaching methods. Comparisons have been made largely on the basis of scores on objective type tests. The usual conclusion reported was that there was no difference; the facts in the case may have been that the measuring instruments were inadequate for finding differences that actually existed.

A second observation is that the instruments used in evaluation in the past have been limited in large part to tests of information and of understanding. There is undoubtedly a growing consciousness that evaluation involves much more than can be accomplished by the use of subjectmatter tests. There is a recognized need for instruments to evaluate methods of thinking, as well as effects of school and other experiences on ideals, interests, appreciations, conceptions of value in life, and other features that influence or determine individual behavior. Some progress has been made in supplying these instruments, but it seems fair to say that we are not yet able to describe with anything approximating precision the effects, from experiences designed to be educational, on the behavior of the developing individual.

A third feature which is more in evidence in the recent studies is emphasis on educational theory particularly as it relates to conceptions of educational values. The effect of this emphasis is seen, in the more recent studies, in the clearer statements of the problem under investigation and in the closer relationship between the problem and the technics and instruments employed.

## CHAPTER XIII

### Social Studies

HOWARD E. WILSON

**P**UBLISHED ARTICLES dealing with the teaching of the social studies have tended during the past eight years to become more characterized by philosophizing and *a priori* judgments than by experimentation," wrote Murra (607) in May 1937. The same generalization, though to a less striking degree, seems to apply also to the great body of unpublished materials, largely in the form of master's theses, written during the present decade. America's preoccupation with industrial and political problems, and the pressing need for adapting social studies instruction to the demands and trends of contemporary society, have tended to absorb the attention of students of the teaching of the social studies.

In spite of these conditions, a goodly measure of work in the name of research has been carried on. This discussion will review a number of studies, both published and unpublished, which pertain to (a) the measurement of outcomes connected with social studies instruction, (b) the development of social studies tests, (c) the construction or reconstruction of the social studies curriculum, (d) methods in teaching, (e) materials for teaching the social studies, and (f) the ability and the training of social studies teachers.

#### Evaluating Pupils' Achievement

In a doctoral dissertation, Melbo (601) assayed the information possessed by 4,348 seniors ready to graduate from 38 representative high schools in California. A test was carefully made dealing with 200 important contemporary problems and issues as determined by analysis of books and magazines in 1932-34. Melbo found that seniors possessed information on about a third of the issues, no information on another third, and misinformation on the other third. There were significant differences among schools, but the differences were apparently not related to size of school and community. Boys were consistently better informed than girls, but there was virtually no correlation between amount of information possessed and extent of work in social studies. His conclusion was that "the present social studies instruction of the high school, irrespective of the total effects of other sources of information and misinformation, fails to provide graduating high-school seniors with adequate amounts of correct information about contemporary problems and issues as a necessary prerequisite to intelligent social action in a democratic state."

From the same institution, another dissertation dealt with the attitudes and opinions of California seniors. Smith (611) constructed alternate

forms of tests measuring pupils' opinions in respect to industry, the school, family, religion and ethics, and the state. Test items were based upon materials pertaining to these topics found in the work of frontier thinkers. Tests were given to 1,173 seniors, 192 of their teachers, 288 parents, and 72 college professors. Smith found parents very conservative, and that pupils' scores correlate with parents' scores more highly than with teachers' scores. Parents and seniors exhibited more inconsistency than did school teachers, but the teachers exhibited more inconsistency than did college faculty members. "There is little evidence that social science instruction in our schools is succeeding in developing in our California high-school seniors attitudes and intelligent opinions toward issues basic to citizenship and social betterment beyond those which are shared by pupils' parents as a group."

A number of other studies of attitudes indicate an increasing concern of social studies teachers in that field. Moore (603) secured questionnaire returns from 3,769 third- and fourth-year high-school pupils in 32 communities, indicating through autobiographical evidence the measure of their "social impulses," or altruism. Analysis of his data indicated that "while a large proportion of students seem to have a real ambition to contribute to social welfare, the statements of many of them . . . do not indicate that they appreciate the importance of working with others to this end." He found little evidence of the effectiveness of social studies instruction in this area. Using the Thurstone Attitudes Scales with small groups and under uncontrolled conditions, Longstreet (599) reported that instruction in American history seemed to have little effect on the attitudes of high-school seniors. Using a questionnaire to determine the attitudinal consistency of 674 high-school seniors, Koeninger (595) came to the conclusion that 75 percent of them are highly inconsistent in the reactionary-to-radical points of view. Strothers (612) analyzed the citizenship rating and scholastic marks of 900 pupils in one high school, 1931-34, and found, as might be expected, that "the scholastic achievement of pupils of high citizenship standard is clearly superior to that of pupils with a lower citizenship standard," but that "pupils in any section can and do earn high citizenship marks regardless of their scholastic achievement."

King (594) analyzed the reactions of groups of junior high-school pupils and revealed serious inadequacies in their understanding of social concepts. Murra (606) analyzed the achievement of 1,414 sophomores in Middle-western colleges and universities on the Wesley Test in Social Terms, Thurstone Intelligence Test, and Minnesota Reading Test in relation to course work in social studies. He found slight relationship between courses taken and achievement on the Wesley Test, but where a relationship existed it showed that college courses were more effective than high-school courses, and that courses in government, economics, and sociology were more effective than history courses.

## Tests in Social Studies

Closely related to the determination of outcomes of social studies instruction and of school living generally is the development of instruments of measurement. In 1934 Kelley and Krey (592) summarized achievements in test building for the purpose of measuring a number of desired outcomes of instruction. One of the tests reported in this volume is the *Wesley Test in Social Terms* (615); Bolton (574) has since reported the use of this test as a predictive instrument. He found the Wesley test to have higher predictive power in high-school American history classes than the Stone Reading Test or the Otis Group Intelligence Scale.

In a doctoral dissertation, Farley (585) developed a test of factual relations in American history. The items of the test were carefully proportioned among the periods of history and also among economic, social, political, and military aspects, on the basis of an analysis of commonly used textbooks, courses of study, and teachers' examinations. A group of tests of the more elusive outcomes of instruction produced in recent years is described elsewhere by Wrightstone (617). These tests were built through research and exist as useful instruments for further research.

## The Social Studies Curriculum

Research in the history of the social studies curriculum was excellently summarized and interpreted during the period under discussion by Tryon (613) in a volume generally available. There has been a great deal of activity in curriculum-making, but relatively little in the area of direct research on curriculum content. Harap (589) reviewed 28 secondary-school and college courses in consumption, to conclude that the former were definitely more "practical" than the latter. Koos (596) analyzed 16 textbooks in social studies, and pointed out that they neglected almost entirely the functional aspects of education of the consumer.

Since early 1934 a few studies, based on the technics of activity analysis, have been made for the purpose of selecting content for curriculums, but these are generally no more conclusive as guides in curriculum-making than were their predecessors. Goodhue (587) analyzed the treatment of materials on the Far East in the Sunday issues of the *New York Times* for the period 1925 to 1935, and pointed out that on the basis of word-count, space was accorded the following topics in the order indicated: Philippine relations, Japanese relations, and Chinese relations, while matters pertaining to the South American Pacific Coast, to Hawaiian relations, and to Samoan relations, ranked decidedly below. Meyer (602) analyzed periodicals to show that "interest in international questions more than doubled during the World War and that after the War the amount of magazine space devoted to international topics fluctuated on a level about twice as high as before the War."

Jordan (591) analyzed 60 textbooks to discover the concepts, problems, and generalizations basic to an understanding of the conservation of natural

resources. He found that the conservation of human resources loomed largest, with soil conservation, preservation of forest resources, general resources, water resources, wild life, minerals, and coal, coming in the order named. More treatment was accorded the concepts, problems, and generalizations in the social studies texts than in the natural science texts. In a doctoral dissertation, Balcomb (571) tabulated references to 100 important Americans in periodicals, and, on the basis of the references, suggested what content should be taught about the individuals. Broadbent (575) made a survey of the music books used in junior high schools and of lists of phonograph records to discover and classify the music suitable and available for correlation with the junior high-school course in American history. Bigelow (573) analyzed 60 textbooks in history, concerning their treatment of the fine arts, and concluded:

There is a slight tendency toward an increase in the number of lines used in reference to music and the other arts noticeable, particularly since 1930. The tendency is most marked in American history texts, to some degree in the European history texts, but is negligible in the world history texts. The textbooks of the last twenty years . . . are marked, on the whole, by their lack of or extreme brevity in the mention of music. Literature and the space arts as a whole are dealt with much more fully. The arts of earlier cultures and through the period of the Renaissance are referred to more often than are the arts of the Modern Era. . . . The references as a whole are not well integrated with other phases of history.

One study, though not widely applicable in its results, suggested a technic of considerable practical value in that phase of curriculum-making which seeks more extensive use of the community as a social studies laboratory. After reviewing excellently the rise of "the school excursion" in European and American schools, Shepherd (609) tabulated the "visitation possibilities" for social problems classes in one community. His study makes possible the definite enrichment of the curriculum in that one community, and in many ways is a worthy model for curriculum workers elsewhere.

### **Methods of Teaching Social Studies**

A number of studies have sought to evaluate phases of teaching procedure, usually on a comparative basis, but the studies of recent years have been no more conclusive than those of earlier years.

In a short and loosely controlled study, Frits (586) found that the "work-book," the "contract," and the "traditional assignment-recitation" methods influenced pupils about equally as respects their acquisition of civics information and their development of civic attitudes. Shafer (608), in another loosely controlled situation, found evidence that cooperative supervision and teaching between teachers in the same school, combined with a "contract" method of teaching, resulted in increased achievement by pupils. In an experiment conducted in the Evanston, Illinois, high school involving 68 boys and 32 girls, grouped in a superior section of 25, an inferior section of 25, and an "average" section of 50, the conclusion was reached that fur-



ther individualization in instruction was needed than "sectioning" provides (614). The data showed the desirability of individual diagnosis, recognition of individual differences, the teaching of reading by all teachers, and the importance of the personal interview in motivation. Douglass and Pederson (582) compared the achievement of two equated groups of pupils, one working under the "unit plan" and the other under the "study-recitation" plan. They concluded that the unit plan is slightly superior in the hands of well-trained teachers, and that the plan is probably better suited for bright than for dull pupils.

Using an "enrichment syllabus" which provided for a great deal of club work and committee study and report with one group of ninth-grade pupils in civics, Gregory (588) found their work superior to that of an equated group taught by the same teacher in a good but conventional manner. Wrightstone (616), in a number of fairly well controlled studies, found that flexible procedures involving a considerable measure of pupil activity, yielded superior learning. Leggitt (598) showed that increased achievement in the performance of certain study skills resulted from direct instruction in the skills. Dixon (581) used outlining as the sole study skill in one of two groups of ninth-grade pupils and concluded that, as the sole study skill, it is no more effective than other skills for the acquisition of facts, but that it seems to improve reading skills, and when used in combination with other skills, it would probably have increased effectiveness.

McKathan (600) in a well-controlled investigation, involving 3 teachers and 100 pupils, had daily objective check-up tests given in alternate two-week periods for a full year. Carefully constructed but unstandardized tests were given at the end of the first and second semesters. The tests measured only the acquisition of information, but in that area, pupils learned and retained significantly more during the periods in which the daily tests were used. Kerr (593) found a great variety of misconceptions of pupils in geography and, by the analysis of stenographic reports of classroom discussions held previous to the testing period, traced a good many of the misconceptions to erroneous statements made by the teacher or to uncorrected wrong statements by pupils.

### **Materials for Use in Teaching Social Studies**

A number of studies have been made dealing with the equipment used in teaching social studies. Among these are vocabulary studies of books now in use. Leavell and Hollister (597) found that 300 pupils in Grades VII and VIII listed 3,733 different words found in the social studies books they were using as unfamiliar terms. Baumgartner (572), analyzing four textbooks in United States history for the senior high school, found that, on the average, they used 21.1 technical phrases for every 100 lines of text material, and that juniors and seniors, tested with a random sampling of the material, were familiar with only about half of the terms. Diehl (580) analyzed four sets of geography textbooks and found that "approximately 500 to 550 terms need to be mastered by a child in the course of his elemen-

tary training if he learns to read maps well." Classifying the terms according to function, Diehl found that about half of them expressed descriptive ideas, about a fourth were used in naming features, and the other fourth were used in naming conditions and symbols. In another classification, 39.7 percent of the terms were semi-pictorial symbols; 37 percent related to color band, dot, and spot markings; 13.8 percent were orientation symbols; 6.2 percent were "nature-of" symbols; and 3.2 percent related to iso-line symbols.

In a rather uncritical investigation, Jamison (590) devised an attitude scale and an achievement test for American history and gave them to two roughly equated groups of high-school pupils, taught in similar fashion except that one group read from 8 to 12 volumes of historical fiction during the year and the other did not. The test results indicated that historical fiction effects only a slight change in pupils' attitudes toward history, but that it augments pupils' informational achievement. Sherrod (610) and C. C. Crawford and Sherrod (576) analyzed the vocabulary grade placement of a group of magazines, rating each as to difficulty, diversity, and interest. Day (578) investigated the teaching of current events in one school system, giving locally constructed tests to all pupils in Grades VI-XII. Various classes had been taught by different methods, but in all of them boys exceeded girls markedly except in Grade VII. Variability among different rooms in the same grade was great. Holding I.Q. constant, he found that best results were secured through systematic instruction with the use of newspaper clippings. Second-best results were secured with systematic instruction using pupils' current-events periodicals. Informal instruction in the sense of unplanned instruction resulted in pupils falling short of expectancy. The author concluded that "the materials did not appear to make so much difference as the manner in which they were used. Newspaper clippings, when systematically used, were somewhat more effective than a current events periodical, but a teacher is much more likely to treat current events systematically if she has a periodical."

### **Social Studies Teachers and Teacher-Training**

A few studies have been made bearing upon the qualities and training of social studies teachers. Erb (584) surveyed the opinions of social studies teachers in Colorado regarding fundamental problems of national and international scope, and suggested that the inadequate treatment of the problems in schools is due to the inadequate background of teachers respecting them. On the other hand, in a more carefully controlled fashion L. T. Crawford (577) used a current-events test to show that, in that area, experienced teachers were better informed than inexperienced teachers, that men ranked higher than women, and that social studies teachers were definitely better informed on current problems than were other teachers. Epply (583) analyzed the records of social studies majors in one state teachers college for the years 1931-33 and found that women majoring in social studies did better work than men and that there is little difference

in the performance of the total group in their field of concentration as contrasted with other courses taken. Delander (579) analyzed the content of special methods courses in history and the social studies in 64 teacher-training institutions showing the lack of standardization among them.

### **Conclusion**

The review of this research in the teaching of the social studies is not encouraging. Most of the investigations but touch the fringe of the basic problems in the field; many of the studies are so uncritically conceived and carried out that their results are not impressive. The need for further training of students and teachers of social studies in the possibilities and technics of research in their field is of basic importance if the future is to yield definitive investigations of most of the problems involved in teaching the social studies.



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